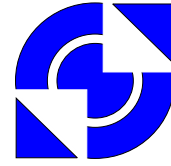


TELECOMMUNICATION
ENGINEERING



UNIVERSITY
OF
TWENTE

University of Twente
Department of Electrical Engineering
Chair for Telecommunication Engineering

Guide for writing assignment reports

by

A.B.C. Surname

Master thesis/Bachelor thesis

Executed from ... to ...

Supervisor: prof.dr.ir. S.I.K. Bok

Advisers: dr.ir. W.E.E.T. Veel

ir. Z.W. Etser

Summary

This manual describes how reports on assignments executed at the Chair for Telecommunication Engineering should look. It comprises prescriptions and guidelines about the format and the style of writing.

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Parts of the report

The report should comprise the following parts in the given order:

1. Title page;
2. Summary;
3. Contents;
4. List of abbreviations and symbols;
5. Introduction;
6. Body of the report;
7. Conclusions and recommendations;
8. References;
9. Appendices.

The list of abbreviations and symbols, and the appendices do not always make sense and thus can sometimes be omitted. The other parts should always be present in the report. This manual and the logos on the title page can be downloaded from the Internet via the education page of the chair's web-site.

1.1 The title page

The lay-out of the title page has to look like the title page of this manual. The title of the report should be as concise as possible on one hand and on the other hand it should nevertheless reflect the main subject of the assignment.

1.2 Summary

The summary takes one half to an entire page to briefly describe the contents of the report. It deals with the problem statement, used solution method, results and conclusions. The reader should be able to get insight in the essentials of the report. The summary should not comprise any abbreviation or reference. Neither is it allowed to use terms that are defined in the report and that are not generally accepted.

1.3 Contents

The titles of chapters, sections and subsections should be concise so that the contents serves as a guide to retrieve a specific part of the report where the reader is interested in. Use the facilities of \LaTeX or WORD to automatically generate the contents; this avoids making errors.

1.4 List of abbreviations and symbols

Such a list is only useful if many abbreviations and symbols are used in the report. The list presents the used symbols in alphabetic order where symbols in lower case come first, followed by upper case symbols and Greek symbols, respectively. So the order is: a, A, b, B, c, C, . . . z, Z, α , A, β , B, γ , Γ , . . . , ω , Ω . Produce a separate list for the abbreviations and use the same order.

When an abbreviation is used for the first time in the report then this abbreviation should be put in between parenthesis after having written the full text, e.g. “Coherence Multiplexing (CM) is used as ...”

1.5 The introduction

The introduction comprises the problem statement or aim of the assignment and a short overview of the relation with other work, or what has already been done before. Next the contents is briefly sketched. The introduction is the first chapter of the report.

1.6 The body of the report

This part should clearly reflect the specific achievements of the assignment. Results and extensive theoretical derivations of other authors should only be referenced as far as it is of importance for the problem at hand. Don't make this part too long. Try to keep it within approx. 50 pages. The level has to be such that each master student is able to understand. Keep in mind that the report is not written for the adviser

or supervisor, but that in principle it is a public report. This part is subdivided in chapters each describing an essential part of the assignment.

1.7 Conclusions and recommendations

Conclusions and recommendations are subject of a concluding chapter. Use one or a few pages to summarize the results you achieved, draw conclusions from that and indicate the consequences. Clearly refer to the problem statement of the assignment. Furthermore, this chapter may comprise suggestions for further research.

1.8 References

The list of references comprises data of all books, papers, reports, etc. where you refer to in the text, and that were used to base the work on. For a detailed description of the format to present references see Section 2.7 of this guide.

1.9 Appendices

The appendices comprise all derivations, details, schemes, listings, etc. that make the body of the report unnecessarily long or boring. It means that at first reading they can be skipped. One should be able to retrieve the results of the appendices in the body of the report. On the other hand, in the body one should refer to the appendices.

Typographical details of the report

2.1 Introduction

As far as the typographical issues of the report are concerned there are two options, both on A-4 paper format. The chair prefers the use of L^AT_EX as word-processor. A style-file for that is available from the group's WEB. Using this style file, the report automatically satisfies the lay-out and typographical requirements (such as fonts, headings of chapters and (sub)sections, margins, and the numbering of pages, chapters, equations, figures and tables, etc.) as prescribed in this guide.

As an alternative the report may also be prepared using WORD. In that case use font Times New Roman, font size 12 pt. Set the line spacing to 1.2, left and right margins to 2.5 cm, top and bottom margins to 2.3 cm. A nice result is obtained if in the 'Page setup' a gutter of 1 cm is inserted, where this value is alternating set to the left (odd pages) and right (even pages). The alternating gutter is based on the custom that odd pages are on the right and even pages on the left. A new chapter always starts on an odd page; if needed insert a blank page for that at the end of the preceding chapter. Odd page numbering at the right of the page and even page numbering at the left. The first page of Chapter 1 starts with page number 1. All preceding pages are numbered using Roman numerals for page numbering.

As far as the typographical issues are concerned this guide serves as a model for the report.

2.2 Chapters

The subdivision in chapters is indicated by numbering the chapters by means of Arabic numerals. The lay-out should be as in this guide. For the chapter header use Helvetica font upper case bold, font size 14 pt. Around the headers a little bit more white space has to be produced as in this guide.

2.3 Sections

Sections are numbered by repeating the chapter number followed by a dot and the section number. Headers of sections are typeset in Helvetica bold, font size 14 pt, lower case.

2.3.1 Subsections

The numbering of subsections is analogously to that of sections, i.e. the number of the section is repeated, followed by a dot and the number of the subsection. Subsection headers are typeset in Helvetica bold, font size 12 pt, lower case. A further subdivision has to be omitted.

Use labels (`LATEX`) or cross-references (`WORD`) to refer to specific chapters, (sub)-sections, equations, figures, tables, etc. These references are written in upper case, e.g. “... see Chapter 2.”

2.4 Contents

The contents of the report should look as the one of this guide.

2.5 Figures en tables

Figures and tables are continuously numbered per chapter using Arabic numerals, however, figures and tables have separate numbering sequences. Each figure/table is indicated with “Figure” c.q. “Table” and typeset in Helvetica bold, 10 pt followed by the chapter number, a dot and its order number in that specific chapter. After this number there is a colon, followed by a very condensed description (if possible a single line) of the figure/table, preferably after the reference. Each figure/table should be referred to in the text, for example “see Figure 1.1”. The figure en table description is Helvetica 10 pt and centered. The difference in typesetting between figures and tables is:

- ⇒ caption and numbering of tables are on top of the tables;
- ⇒ caption and numbering of figures are at the bottom of the figures.

Figures and tables are as a paragraph placed in the text as close as possible to the position where the text refers to that specific figure/table. Detailed schemes and extensive tables are to be moved to appendices.

Example of a table.

Table 2.1: The transfer function $H(f)$

f kHz	$H(f)$ Ω
-	-
-	-
-	-

Example of a figure.

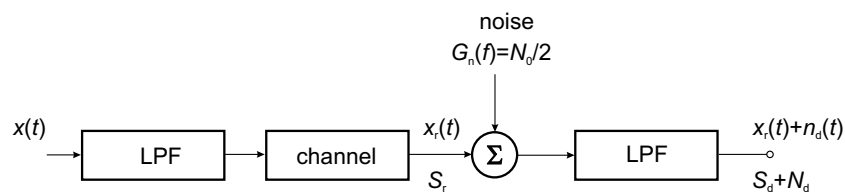


Figure 2.1: Model of a baseband communication system

Figures should preferably be prepared using Coreldraw and exported as .EPS file. Use this latter format to insert the figure into the report. Simulations to be executed in MATLAB and the resulting graphs exported and inserted as .EPS file.

2.6 Equations

Equations are continuously numbered. The equation number is put between parentheses and flushed right. Use the facilities of the word processor to automatically generate the equation numbering. All variables have to be defined in the text or by means of definition equations. Variables and function names are typeset in “italic” (e.g. $f(x)$), also when they are used somewhere in between the text. Equations should be surrounded by some extra white space with respect to the text.

Use the following mathematical symbols in formulas and equations:

\approx approximately equal to;

\propto proportional to;

\neq unequal;

\triangleq definition equation.

In next situations “roman” font is used:

- * standard function names as “sin”, “log”, “erfc”, etc.;
- * the differential symbol “d”;
- * units as “volt” (“V”), “ampère” (“A”), etc.;
- * text in an equation, e.g. “ $y = 1$, for $x < 2$ ”;
- * numbers as: 2, π , j, e (use preferably $\exp(\cdot)$ instead);
- * subscripts if they are no variables as: x_2 , V_{out} , η_{eff} , etc.;
- * symbols for chemicals and materials, e.g. LiNbO_3 ;
- * parentheses, brackets, braces and operators as $(\{ + * - \})$;
- * (in)equality sign and punctuation marks as $= \neq < ? > , ! ;$;
- * vectors are typeset in lower case bold;
- * matrices in upper case bold.

Examples of equations:

$$y = ax^2 + bx + c, \quad \text{for } x < 2 \quad (2.1)$$

$$u_2 = \frac{1}{5!} \int_{-\pi}^{\pi} (ax^2 + \sin(x) + \log(x)) dx \quad (2.2)$$

2.7 References

Citations are indicated in the text by putting the number of the corresponding reference from the reference list in between square brackets, for example “... as has been shown in [1].”

In the reference list the reference number is also put in between square brackets. The order of this list should be the order as they appear in the text. In case the reference is a book then the reference list item starts with the initials of the author(s) followed by his/her/their family name(s). After a comma give a carriage return; on the new line is the book title in *italic* and eventually the edition. Then at another new line the name of the publisher, a comma and the year when the book was published. As an example: see reference [1]. In case you refer to a specific result or equation mention the page where this can be found in the following way “... see [1, p. 137].”

In case of referring to a paper start with the initials of the author(s) followed by his/her/their family name(s). After a comma give a carriage return; on the new line is the paper title in between quotation marks, followed by a comma. On the next new line is the title of the journal in *italic*, a comma, number of the volume, month or

number of the issue, comma, “pp.” followed by the first page, a dash and the last page, comma, year of publishing. For an example see reference [2].

In case of referring to a conference paper, the format is the same as a journal paper, except that volume and issue do not have a meaning and can be omitted. For an example see reference [3]. Note that the order of page numbers and year are interchanged compared to a journal paper reference.

In case the reference is an assignment report then start with author name and title as given for a book. Then “Bachelor thesis” or “Master thesis”, the name of the group, the month and year of publishing.

The reference list is dealt with as chapter but no chapter or section number is assigned to it.

2.8 Appendices

The appendices are indicated by means of alphabetic characters (for example: Appendix A, Appendix B, etc.) and always have titles like chapters. The page numbering of the report is continuously extended in the appendices.

Typical material for appendices is: extensive mathematical derivations, design drawings, extensive measurement results, listings (to be typeset in Courier font), etc.

In contrast to the summary, an appendix can comprise references to literature.

Linguistic usage

3.1 Spelling

When writing the report avoid spelling, linguistic and typing errors. Use a spell checker before finalizing the report and read carefully the final version or even better ask a friend to read it for these checks. Use only official spelling and in case of doubt have a look in a dictionary [4, 5].

3.2 Writing style

In a report you should omit the word “I” but use “we” or “one”. Don’t produce long sentences. Short sentences are easier to read. Avoid the use of many clauses and double denials, they cause confusion. Make a proper use of punctuation marks [4]. For a guide on a proper writing style see [6]. If the writing styles in those references differ from the one prescribed here, this guide prevails.

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