WRITING INSTRUCTIONS

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General writing instructions for reports and theses

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Abstract

These writing instructions cover all reporting from short reports to bachelor and master theses — for short, only the term 'report' is used from now on. First, we define the layout of the report. Then the contents of the different parts of the report are described and finally, some illustrative examples are given. For thesis writers, instructions for preparing the final pdf-file are given in the Appendix A.

Keywords: The list of keywords is only required in the thesis. In photonics, it is recommended to use terms existing in OSA's Optics Classification and Indexing Scheme (OCIS) [1]. Note that keywords are typically used in information retrieval systems to indicate the content of the document — so select them carefully! It is reasonable to separate keywords with the `\sep`-command so that they can be easily copied in the metadata-file, which is also needed only for the thesis. Example: in your LaTeX-file you have `keyword1\sep keyword1\sep keyword1\sep ...` and the final result looks like: keyword1; keyword2; keyword3; .... Note that when you are using `Word` you can just type your keywords separated with a semicolon (;).

Contents

Chapter I

General writing instructions

Generally, writers do not pay enough attention to the layout of the reports although modern word processors offer excellent possibilities to create spruce layouts. In the field of physics the TEX/LATEX-systems offer definitely the easiest way to produce nice looking reports. It is really easy to start with the LATEX by simply using the example files with which also this document is produced. However, the usage of LATEX is not obligatory; it is allowed to use any modern word processing system which is capable of producing nice looking mathematical formulas. Thus, also `Word` templates are available.

These writing instructions are meant to be followed as precisely as possible regardless of the word processing system that is used. All questions related to the layout are in the last resort matter of opinions, but every scientific publication series have their own writing instructions which have to be followed.

In this chapter general instructions concerning the structure of the report and the content of the various parts of the report are given. The short guide for tenses is given in a table format in Appendix B.

1.1 Layout

Most important aspects affecting the layout are the placing of text on the page and the outlook of figures and tables. In the following detailed instructions for preparing these things properly are given.

1.1.1 Basic matters

In the beginning of the report, the following things are obligatory: the cover page, the abstract, and the table of content in this order. Additionally, especially theses may contain a preface which has to be placed between the abstract and the table of content. The report consists of the chapters[1] of which the first one is *Introduction* and the last one *Conclusions*. The conclusions are followed by the list of *References* and *Appendices* if any.

Reports are written on A4 paper. The chapter always begins from a new page. The chapters are numbered in a similar way as in these instructions. (Note the labeling of chapters: **Chapter I Introduction** instead of **1. Introduction**. After the chapter title, there is some space before the short introduction to the content of the chapter. At the end of the introduction, there is a short description of the content of the chapter. *There never exists two titles one after the other!* The chapter consists of sections and subsections. If the section consists of subsections, the above-mentioned introduction is needed. In the numbering of sections and subsections, three level numbering is used, at maximum: 2.1 *Section*, 2.1.1 *Subsection1*, 2.1.2 *Subsection2*, etc.

The list of references is not a chapter, but really just a list, so it is not numbered. References are cited using the so-called numbering system where a reference exists in the text as a number in square brackets, like [21].[2] Possible appendices are labeled with running labels (Appendix A, Appendix B, etc.) and named suitably. List of references and appendices are added to the list of content. In the list of references, the official abbreviations of the journal names have to be used. It is easy to find these abbreviations by googling '`journal abbreviations`'.

1.1.2 Page settings and font sizes

Following dimensions and font sizes should be automatically correct when LaTeX or other texture templates are used: Font type has to be Times (New) Roman and line spacing has to be 1.2. Left margin is wider than the right one for a good reason: after bookbinding the text seems to be in the middle. Chapter, section, and subsection

[1] In short reports, only section and sub-section levels are used. Then the first section is *Introduction* and the last one *Conclusions*.

[2] Students on teacher specialization option may use "(author's name - publication year)" citation style, see Appendix C.

width of text:		15.0 cm
margins:	left	3.2 cm
	right	2.8 cm
	up	4.5 cm
	bottom	4.5 cm
pagenumbering:	middle	3.3 cm from the bottom
font sizes:	title	25 pt bold, capitals
	chapter titles	17 pt bold
	sections	14 pt bold
	subsections	12 pt bold

titles require a proper amount of spacing around them, see this example. The main rule is that there is somewhat more space before the title than after it — for equations, figures, and tables the space above and below is equal. The LaTeX users don't need to worry about these settings because they are automatically correct. Also in `Word`-template files these settings should be correct but it is better to check them. The others have to adjust these settings by measuring correct values with a ruler from this document and defining them in the texture on use.[3]

1.1.3 Figures and tables

Figures and tables are separate objects which should preferably be located on top of or at the bottom of a page or before a new section. *Locating them in the middle of the text is not recommended.*

A good figure is simple, informative, and clear. To reach these aims figures have to be designed carefully. A single figure can contain just one idea which is simplified as much as possible. One figure may contain four theoretical or experimental curves, at maximum. It is recommended that one figure contains only one 'y-axis', on the left hand.

[3]Before typing check that A4-paper size is selected for your document. (In WinEdt this paper size selection has to be done also for execution modes `dvi2ps, dvi2pdf, ps2pdf, and pdflatex`.) When printing pdf-files select the actual size to avoid nasty scaling of the document.

Following, some guidelines for the figure dimensions are given:

width of the figure	12.0 cm	
line thicknesses	0.5 pt	thin, eg. axes
	1.0 pt	medium, basic curves
	1.5 pt	thick, eg. to emphasize the main result
line types	1) —	solid line
	2) – –	dashed line
	3) – · –	dash dotted line
	4) · · ·	dotted line
data symbols	1) ○	circle, open or solid (black)
	2) □	square, open or solid (black)
	3) △	triangle, open or solid (black)
	4) ×	cross

The used font size in the figures may not be bigger than in the text, i.e. 12 pt. Recommended font types are Times (New) Roman and Helvetica. In a good figure, the height to width ratio is 2:3 (for example the basic settings of Matlab for A4 paper size will do fine). The used line thicknesses should not to be too thick, because this makes the figure heavy and lines are not in balance with the text. Colors are allowed, but the colors have to be selected so that the lines can be distinguished easily also in black and white printings. In the section 3.3 more instructions about how to include figures in the LaTeX environment are given.

Table titles have to be placed above the tables. The title has to be simple and informative: all used markings have to be explained. All details, explanations for anomalies, and comments can be put as footnotes. Footnotes can be labeled with letters (a, b, c, ...) or with special characters as superscripts at the corresponding place. The usage order for special characters is $*$, †, ‡, §, #. If more footnote markings are needed, the above mentioned characters may be doubled ($**$, ††...), etc.

1.2 Citing and list of references

The searching and usage of good quality references form the basis for the good quality scientific writing. According to the definition given by the National Advisory Board

on Research Ethics in Finland it has to be notified that characteristic features of a good quality research include, i.g. honesty, meticulousness and accuracy in studies, in data storing, in presentations and evaluations, and ethicality and openness. Most importantly, the student or researcher is him/herself responsible for the good quality research practices. For example, the good quality research practices are violated when the former results are cited improperly, results are distorted, or texts are copied, i.e. plagiarized. [2]

When the reference given in the text refers to one single thing in the text (e.g. some constant), it is placed just after it. If a single sentence is based on some reference(s), they are listed just before the full stop. If more than one sentence come from one or more references, the references are listed after the full stop of the last sentence.

The list of references should be as comprehensive as possible to cover all the previous work of the research topic. But it is important to think carefully which of the found references are really original and useful and include just them on the list of references. When books are used as references the author has to decide whether it is necessary to refer to the whole book or to one chapter or possibly just to selected pages and put this information on the reference list. The layout of the proper reference list is shown in the example reference list of these writing instructions.

Chapter II

Content of report

In this Chapter contents of the different parts of the report are briefly described. The division of these subjects into chapters has to be done so that each chapter forms a coherent whole.

2.1 Preface

In the preface, you may inform the reader about your motivation to write your thesis and your experiences during the writing of your thesis. You can also use the preface to help the reader get started and to thank people who have helped you with your thesis.

2.2 Abstract

The next page after the cover page is reserved for the abstract. The abstract has to be short but a clear and comprehensive description of the content and results of the work. The abstract should be written after all other writing when the author has clarified himself/herself the meaning of the work and the importance of the results. It is worth the effort to spend plenty of time for writing the abstract, because the quality of the abstract shows the author's ability to express things in a short and compressed form.

The abstract has to contain the following parts: the subject of the research, methods, most valuable results and conclusions. The abstract may not include equations or citations. Presenting claims or conclusions which are not handled in the work is not allowed. In long reports, the (long) abstract can be divided into a

few paragraphs.

2.3 Introduction

The main purpose of the introduction is to give the necessary background information related to the work. This part contains typically plenty of citations. Recommended length for the introduction chapter is approximately a couple of pages.

According to regular reporting instructions, the introduction should contain the description of the research problems of the work as well as the aims and methods of the work. At the end of the introduction the description of the content of the report chapter by chapter (or section by section in short reports) has to be written.

2.4 Methods / data

This part can be divided into several chapters. The author has to do this division by his/her own discretion; the aim is to form a presentation which is as clear and as logical as possible.

In this part, the essential theoretical background and other background information have to be given. Also, the computational methods which will be used have to be described. If the nature of the work is experimental or it includes an experimental part, the equipment, and experimental setups which will be used have to be presented as well as the possible data analysis methods.

2.5 Results

Also, this part can be divided into several chapters. In physics, results are typically presented with figures and tables. The main purpose of the text is then to locate and explain the graphical information about the figures and tables. In addition, in the results part, the main results have to be described verbally (this may be supported by the used figures and tables). The results have to be commented and they have to be compared with the former results from the literature if possible. The purpose of this kind of comparison is to prove the validity of the achieved results. In results, also all anomalies or deviations from the expected, theoretical, or former results have to be explained. If possible, some generalizations based on the results should be presented.

2.6 Evaluation of results

This chapter is usually named *Conclusions*. The purpose of this chapter (section in short reports) is to briefly present the background of the work, and most importantly, the main results. Achieved results have to be interpreted and evaluated and some conclusions and possible hypothesis have to be given whenever possible. Also in this chapter, it is possible to refer to former results to support your own achievements. Inclusion of some suggestions or proposals for further studies or actions is also recommended.

Chapter III

Some writing examples and tips

The aim of this chapter is not to teach the usage of LaTeX, for this purpose there is a few lectures as a part of the *Communication skills* –course. The idea of the explanations and examples of this appendix is to guide to write reports using the sample files. In addition, the purpose of the examples is to show how the formulas, the figures, and the tables should look like. With LaTeX sample files, this should be easy – the users of the other textures have to do their best to reach a similar result. The `Word`-templates offer a good starting point for those who are not willingly to use LaTeX.

3.1 Basic layout

For LaTeX-users there is three different main files: `report_short.tex` for short reports (less than ∼ten pages), `report_long.tex` for long reports, and `thesis.tex` for Bachelor and Master theses. The actual content can be written in separate files which are then included into the main document by using `\include{}`-command. All files, which are included into those main files need to be modified and of course you may divide your work in additional files and just include them in the main file.

For `Word`-users there is two template files: `report_short.doc` for short reports and `report_long.doc` for long reports and theses. For the usage of those template files, see the appendix of the corresponding template.

For making the list of references the BibTeX-system is recommended when the LaTeX is used – more about this topic in the section 3.5. The list of references is created in the right place by the commands `\bibliography{bib-file-name}` and `\bibliographystyle{uefunsrt}` in the main file. The first mentioned file defines

the bib-file on use and the second one defines the bib-style. The bib-file has to be edited using the examples given in the included `bib`-file of each template.

If appendices are included, the adding of one single appendix can be done by using command `\appendix` and adding of multiple appendices can be done by `\appendices`. The usage of these command is easy to understand by looking at the example file `*_app.tex`.

In the LaTeX, the titles are created by using commands `\chapter{chapter title}`, `\section{section title}`, and `\subsection{subsection title}`. If the chapter title is so long that it does not fit on one line, then the command `\chaptertwo{first part of the title}{last of the title}` can be used to divide the chapter title on two lines. In the other textures titles can be created by using `Heading [1,2,3,...]` commands. With other textures also the creating of the table of content and the list of references is possible, but much more complicated than by using LaTeX.

3.2 Writing equations

In the following the examples are *emphasized* just for clarity – in real report emphasized text is not allowed. The usage of the `amsmath` package is recommended whenever somewhat more complicated equations are needed. This is because the usage of the package makes the writing of equations much easier. In the following some examples of typing equations are given by using `amsmath`. Now, e.g. the Maxwell's equations can be presented as follows:

Electromagnetic field of frequency ω, can be defined in 3D as follows:

$$\boldsymbol{E}(\boldsymbol{r},t) = \Re\{\boldsymbol{E}(\boldsymbol{r})\exp(-\mathrm{i}\omega t)\}\ , \tag{3.1}$$

$$\boldsymbol{H}(\boldsymbol{r},t) = \Re\{\boldsymbol{H}(\boldsymbol{r})\exp(-\mathrm{i}\omega t)\}\ , \tag{3.2}$$

where $\boldsymbol{r} = (x, y, z)$ is the three dimensional position vector and $\Re$ stands for the real part. In a continuous medium these time-harmonic fields fulfill the Maxwell's

equations

$$\nabla \times \boldsymbol{E}(\boldsymbol{r}) = \mathrm{i}\omega \boldsymbol{B}(\boldsymbol{r}) \ , \tag{3.3}$$

$$\nabla \times \boldsymbol{H}(\boldsymbol{r}) = \boldsymbol{J}(\boldsymbol{r}) - \mathrm{i}\omega \boldsymbol{D}(\boldsymbol{r}) \ , \tag{3.4}$$

$$\nabla \cdot \boldsymbol{D}(\boldsymbol{r}) = \rho(\boldsymbol{r}) \ , \tag{3.5}$$

$$\nabla \cdot \boldsymbol{B}(\boldsymbol{r}) = 0 \ , \tag{3.6}$$

where $\boldsymbol{D}(\boldsymbol{r})$*,* $\boldsymbol{B}(\boldsymbol{r})$*,* $\boldsymbol{J}(\boldsymbol{r})$*, and* $\rho(\boldsymbol{r})$ *are the electric displacement, the magnetic induction, the electric current density, and the electric charge density, respectively. In the linear, isotropic medium the corresponding equations take the forms*

$$\boldsymbol{D}(\boldsymbol{r}) = \epsilon(\boldsymbol{r})\boldsymbol{E}(\boldsymbol{r}) \ , \tag{3.7}$$

$$\boldsymbol{B}(\boldsymbol{r}) = \mu(\boldsymbol{r})\boldsymbol{H}(\boldsymbol{r}) \ , \tag{3.8}$$

$$\boldsymbol{J}(\boldsymbol{r}) = \sigma(\boldsymbol{r})\boldsymbol{E}(\boldsymbol{r}) \ , \tag{3.9}$$

where $\epsilon(\boldsymbol{r})$*,* $\mu(\boldsymbol{r})$*, and* $\sigma(\boldsymbol{r})$ *are the permittivity, the magnetic permeability, and the conductivity of the medium. The permittivity* ϵ *may be written as* $\epsilon(\boldsymbol{r}) = \epsilon_r(\boldsymbol{r})\epsilon_0$*, where* ϵ_0 *is the permittivity of the vacuum and* ϵ_r *is the relative permittivity. The refractive index of the medium is defined as* $n(\boldsymbol{r}) = \sqrt{\epsilon_r(\boldsymbol{r})}$*.*

Dividing equations on more than one line

When equations are divided on more than one line, the basic rule is that division is done on the locations of $+$, $-$, $\cdot$, or / symbols and the corresponding symbol is put on the front of the new line. The equation number is aligned to the last line with the exception of equation groups when the equation number is aligned in the middle in the vertical direction. In the following a few examples of the division of equations on multiple lines and writing of the equation groups are given.

Basic example:

$$\begin{aligned} U(x,y,z) = {} & \frac{n\exp(\mathrm{i}kn\Delta z)}{\mathrm{i}\lambda\Delta z}\exp\left[\frac{\mathrm{i}\pi n}{\lambda\Delta z}(x^2+y^2)\right] \\ & \times \iint_{-\infty}^{\infty} U(x',y',z_0)\exp\left[\frac{\mathrm{i}\pi n}{\lambda\Delta z}(x'^2+y'^2)\right]\mathrm{d}x'\,\mathrm{d}y' \ . \end{aligned} \tag{3.10}$$

More complicated example:

$$
\begin{aligned}
&W(x_1, y_1, z_1, x_2, y_2, z_2) \\
&\quad = \iiiint_{-\infty}^{\infty} A(\alpha_1, \beta_1, z_0, \alpha_2, \beta_2, z_0) \exp[-\mathrm{i}2\pi(x_1\alpha_1 - x_2\alpha_2 + y_1\beta_1 - y_2\beta_2)] \\
&\qquad \times \exp\{-\mathrm{i}2\pi[w^*(\alpha_1, \beta_1)\Delta z_1 - w(\alpha_2, \beta_2)\Delta z_2]\} \,\mathrm{d}\alpha_1 \,\mathrm{d}\alpha_2 \,\mathrm{d}\beta_1 \,\mathrm{d}\beta_2 \ . \qquad (3.11)
\end{aligned}
$$

Impressive result, isn't it?

The next example shows how to define one variable with two different ways:

$$
w = \begin{cases} [(n/\lambda)^2 - (\alpha^2 + \beta^2)]^{1/2} \ , & \text{when } \alpha^2 + \beta^2 \leq (n/\lambda)^2 \ , \\ \mathrm{i}[(\alpha^2 + \beta^2) - (n/\lambda)^2]^{1/2} & \text{otherwise.} \end{cases} \qquad (3.12)
$$

How about the definition of the equation group?

$$
\begin{cases} x = r\cos\phi \\ y = r\sin\phi \end{cases} \ , \qquad \begin{cases} x' = r\tan\phi \\ y' = r\cot\phi \end{cases} \ . \qquad (3.13)
$$

3.3 Figures

Independently of the used texture the placement of the figures is always difficult and adjusting their size is an attractive option to get them to fit at a certain place. However, all similar figures (like line drawings) have to be the same size in the whole document. Also, fonts in the figures have to be consistent with each other and with the text, e.g. x or λ has to look similar in text and in the figure. It is also important to remember that figures have to be clear and readable in black and white printings. This goal is easily reached by selecting the line types and colors properly.

In the final printout, the font size in the figures can be at most the same as in the text. In LaTeX the best result is reached by importing figures as `*.eps` or `*.pdf` -files in which all fonts and font sizes are adjusted properly. The recommended tool for preparing figures is Matlab because it allows the use of LaTeX-style fonts directly in the figure preparation stage.

On the next page is an example figure which is originally made in Matlab. In that figure, the labels of x- and y-axes are produced using Matlab's LaTeX-properties as well as the legends in the figure area. Also, font sizes are adjusted so that they fit the text size.

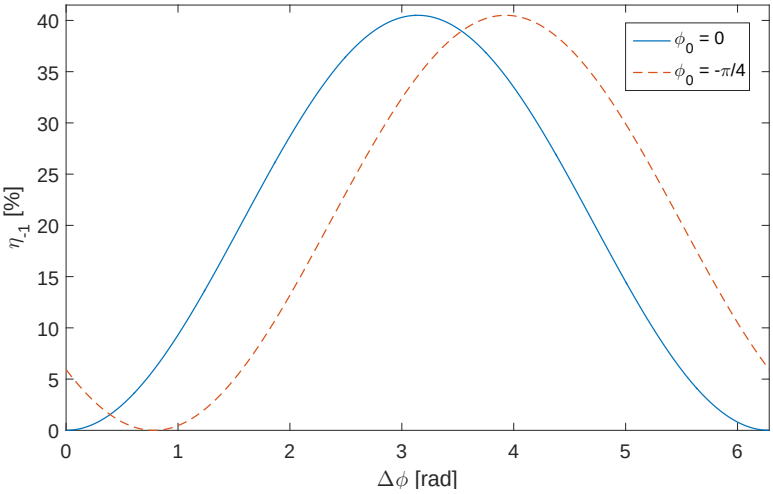

Figure 3.1: In this figure Matlab's LaTeX-properties are used to make labels for x- and y-axes and explanations for line types (legend).

Location of figures and tables can be adjusted in LaTeX with different options: `h` just here, `t` the top of the page, `b` the bottom of the page, and `p` on a separate page at the end of the chapter. With exclamation mark, one may enhance the effect of the options. In addition, with commands `\newpage` and `\clearpage` one may guide the paging and thus affect the placing of the figures and tables.

3.4 Tables

In principle making tables is easy. The main goal in preparing a table is to make it easy to read; this goal can be reached by the proper grouping of the data by using horizontal and vertical lines. Although some textures, like `Word`, produce by default a boxed table, i.e. every cell is framed, this is never the best solution! In the following, there are some examples of tables produced by LaTeX; with other textures it is good to try to produce similar tables. In the placing of the tables one may use the same options as with the figures.

Table 3.1 is an example of a nice looking table. Table 3.2 is more complicated because several columns are combined under a single column title.

TABLE 3.1

Optimized parameters of the beam splitter for three different grating periods d. In table x_1 is a transition point, h is the height of the grating profile, and η_i:s are the diffraction efficiencies. Results are optimized for TE-polarized light at a wavelength of $\lambda = 532$ nm by using the refractive index value $n = 1.46$ for quartz.

d [nm]	x_1/d	h [nm]	η_0 [%]	η_1 [%]
800	0.22	742	6.4	45.1
1200	0.23	718	1.5	45.2
1600	0.41	568	2.2	41.8

TABLE 3.2

Efficiencies E_i, where i is the diffraction order, for three different beam splitters – $1 \to 3$, $1 \to 5$ ja $1 \to 7$. The superscript m stands for the multiple mode theory and r stands for the rigorous theory.

	$1 \to 3$		$1 \to 5$		$1 \to 7$	
i	E_i^{m}	E_i^{r}	E_i^{m}	E_i^{r}	E_i^{m}	E_{3i}^{r}
0	0.3235	0.3237	0.1907	0.1911	0.1413	0.1404
$^+1$	0.3217	0.3217	0.1962	0.1960	0.1412	0.1403
$^+2$	0.0065	0.0066	0.1931	0.1930	0.1408	0.1408
$^+3$	0.0025	0.0024	0.0021	0.0020	0.1397	0.1401
$^+4$	0.0007	0.0008	0.0066	0.0066	0.0007	0.0006
$^+5$	0.0033	0.0034	0.0046	0.0047	0.0038	0.0038
$^+6$	0.0001	0.0001	0.0039	0.0040	0.0016	0.0013
$^+7$	0.0000	0.0000	0.0003	0.0002	0.0002	0.0002

3.5 References

Independently on the used texture, the list of references has to be formulated according to the following instructions.

1. For author names the initials of the first names and whole last name are given.
2. The title of the article is put inside the “inverted commas”.
3. Names of the journals and books are written with emphasized text and official abbreviations for the journal names have to be used.[1]
4. The volume number of the journal has to be bolded.
5. If possible, page numbers of the article are marked on the reference. If the article is identified with some other marking, it has to be put on the reference instead of the page numbers.
6. The year of publication is put in the round brackets and in the case of books the publisher and the place of printing are also put in the brackets.

The reference information has to be put in the same order as given in the above list, see the page 18 for examples. When using numbered citing style, the references are put in the order of existence. If names are used for citing (teacher students), the list of references is put in an alphabetic order.

3.5.1 References with LaTeX

When using LaTeX, it is reasonable to use BibTeX-system for preparing the list of references. For this purpose the article data base has to be created, the file `*.bib` included in each of the template packages serves as an example file. Articles are cited by using the labels given to them and the list of references is generated automatically according to the selected style. The style is defined in the `bst`-file and it is taken on use by command `\bibliographystyle{style}`, where `style` is the name of the used `bst`-file. When numbering is used as a citing system, the style file is `uefunsort.bst` and citing to articles [3–5], books [6, 7], conference articles [8, 9], and www-pages [10, 11] appear inside the text as numbers inside the square brackets.

[1] It is easy to find these abbreviations by googling ’`journal abbreviations`’.

The model of the reference list which is created by using BibTeX-system and `uefunsort`-style[2] is on the page 18. When editing the `bib`-file, article and book references can be added to the file by using commands which can be found in the `Insert-BibTeX Items` menu. The rest of the references has to be added manually, just see `*.bib`-file fore examples. *Note:* In the `*.bib`-files all the fields which are not necessary in those example documents are removed; it is possible to include some additional information, like `number` or `abstract`, in the database – the used `bst`-style defines finally if this information is shown in the list of references. See BibTeX-documentation for further help [12].

3.5.2 References with Word

When using Word, the easiest way to handle the list of references is to do it manually. This can be handled by giving the label for each reference in the text and adding the corresponding, properly formulated reference to the reference list. In this phase, the label can be e.g. the last name of the first author and the publishing year. Finally, when the whole work is ready for submitting the labels has to be replaced with the numbers in the order of the existence. Naturally, possible several occurrences of the same reference exist just with a single number.

In the Word, there is also an automatic citing possibility. If someone is capable of using it and to formulate the list of references properly (see page 18 for examples), of course, he/she is allowed to use it.[3]

[2] Designed especially according to the styles used commonly in the field of photonics.

[3] The author of this document don't know anyone who can do this. If such a person exist he/she should contact the author of this document immediately!

Chapter IV

Conclusions

In this report, basic instructions for writing a report or thesis are given. The layout settings follow the requirements of the Department of Physics and Mathematics at the University of Eastern Finland. The content guidelines are taken from general reporting instructions. In addition to these instructions, template files for short and long reports as well as for theses are available in LaTeX- and `Word`-formats.[1]

[1] In the case of `Word` the long report template serves as a template for theses.

References

[1] Optics Classification and Indexing Scheme (OCIS), https://www.osapublishing.org/submit/ocis/ (visited on 2016-10-25).

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[4] R. Magnusson, M. Shokooh-Saremi, and X. Wang, "Dispersion engineering with leaky-mode resonant photonic lattices," *Opt. Express* **18**, 108–116 (2010).

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[10] University of Eastern Finland, created on 2009-10-22, http://www.uef.fi (visited on 2016-09-05).

[11] Department of Physics and Mathematics, http://www.uef.fi/en/web/fysmat (visited on 2017-11-16).

[12] BibTeX-package, https://ctan.org/pkg/bibtex (visited on 2017-11-24).

Appendix A

Preparing the final pdf-version of MSc thesis

Since 1st of August 2017 the University has required that MSc thesis include metadata information in the final pdf-version of the thesis. The required metadata fields are *author, title, copyright, and organization*. In addition, an optional field *keywords* is recommended. With LaTeX, the required metadata is put in the separate file *mainfile.xpmdata*; the `thesis-package` includes one example file. Take care, that you write title and keywords exactly the same way in this metadata file as they exist in your thesis. The creation of the pdf-file with the metadata has to be done with a command sequence `pdflatex, bibtex, pdflatex, pdflatex`.

With `Word` the metadata is created partly automatically and part of it has to be added manually. The required manual modifications are done by selecting `File` and then `Info` which opens a page where you have to modify the following fields: `Title`, `Tags`, and `Author`. The field `Tags` is meant for keywords: write your keywords in that field separated by a semicolon (;). The final pdf-file with the metadata has to be created by selecting `Save As`, for `Save as type` file type PDF and checking that in the `Options...` the `ISO 19005-1 compliant (PDF/A)` is selected. For further instructions, see http://www.uef.fi/en/web/kirjasto/tutkimuksen-tuki/pro-gradut/pdf-a-tiedoston-luominen.

Appendix B

Tense chart

The chart on the next page is taken from the book *Tiedettä englanniksi: Akateemisen kirjoittamisen käsikirja* (Eva May, Soveltavan kielentutkimuksen keskus, Jyväskylän yliopisto, 1993). The tense recommendations given in the chart are valid when you are writing in English, but they can be applied also in Finnish texts. It is worth to mention here, that although abstracts should be written in the imperfect, the common way is to write it in the present tense.

TABLE B.1

The use of tenses in the various parts of the report.

	future	**present**	**imperfect**	**perfect**	**auxiliary verb euphemism**
abstract					
meaning			×		
target			×		
methods			×		
results			×		
conclusion		×			×
implications		×			×
recommendation		×			×
introduction					
area of the research		×		×	
citing of researchers			×	×	×
citing of previous results			×	×	×
need for further studies		×		×	(×)
aim		×	×		
hypothesis		×			
own research topic		×			
necessity of research					×
main results			×		×
report structure	×	×			
theory/methods*					
research subject		×	×		
theory		×			
references				×	
materials		×	×		
measurement setup			×		
analysis methods		×	×		
results evaluations					
meaning			×		
hypothesis			×		
results			×		
comparison		×	×		
explanation		×	×		×
limitation		×	(×)		
conclusion		×			×
act- or recommendation for further studies or application		×			×
acknowledgements					
financier			×		
other		×			×

*Titles of this part are not the original ones.

Appendix C

Additional instructions for teachers

Also, teacher students have to follow these writing instructions. The only exception to these is the citing method which is based on the usage of names in the teacher line reports and theses. The citing can be done using various commands depending on the situation. The commands are shown in the table below. Because the usage of this citing system requires some other modifications in the LaTeXenvironment, the main example file, `uefreport_tea.tex`, with the required changes is available on the intra-pages of the department. The `Word` users can use the `Word` template of long reports. In addition, with this citing system, in order to define the layout for the reference list, the file `uefapafin.bst` has to be used.

Table C.1
Citing commands and the results.

`\citet{key}`	Jones et al. (1990)
`\citet*{key}`	Jones, Baker, and Smith (1990)
`\citep{key}`	(Jones et al., 1990)
`\citep*{key}`	(Jones, Baker, and Smith, 1990)
`\citep[chap. 2]{key}`	(Jones et al., 1990, chap. 2)
`\citep[e.g.][]{key}`	(e.g. Jones et al., 1990)
`\citep[e.g.][p. 32]{key}`	(e.g. Jones et al., p. 32)
`\citeauthor{key}`	Jones et al.
`\citeauthor*{key}`	Jones, Baker, and Smith
`\citeyear{key}`	1990