



Guideline

for writing a



Report (Thesis)

and for preparing an



Oral Presentation

within the scope of Project and Master thesis at the department of Electrical and Electronic Automotive Systems

Version 1.02



The intention of a diploma or project thesis is to proof the capability of working independently on a clearly defined problem by means of scientific methods in finite time. Often problems and obscurities occur during the documentation of the achieved results. In order to ensure conformity and to give an orientation to the student this guideline has been written. It is supposed to be used as a checklist before and during the authoring of the written report. Most attention should be on the title page, the abstract and introduction as well as on figures and their documentation/description. These parts revive the interest in reading the whole report.

The following listing is not an obligatory demand for a structure, but merely a hint for a meaningful structured report. It is recommended, to discuss the individual outline of the thesis with your supervisor before starting work on the contents of the chapters.

I Structure of the Written Report

The following parts have to be included in the written report according to the given order.

- ☞ Title page
- ☞ One blank page
- ☞ Declaration
- ☞ (Possibly) foreword / acknowledgement / dedication
- ☞ Formulation of the task
- ☞ Abstract
- ☞ Table of contents
- ☞ Introduction
- ☞ State of the art
- ☞ Presentation of the own approach
- ☞ Results, discussion, analysis
- ☞ Conclusion, outlook
- ☞ Bibliography
- ☞ (Possibly) list of figures and symbols
- ☞ Appendix
- ☞ One blank page
- ☞ (Possibly) enclosure



II Particular Hints in Detail

Title page:

The title page is the advertisement of the report. Therefore, it should be designed very carefully. It must contain the following information.

- ☞ Faculty, department, supervising professor, (possibly logo of the university and the department – ask the secretary), address of university
- ☞ Kind of report (project, diploma thesis, etc)
- ☞ Title of the work.
- ☞ Possibly an expressive figure as eye catcher
- ☞ Name and address of the author
- ☞ Supervising staff
- ☞ Official time frame of work

If these information are printed on the second page of the report the cover page should be transparent.

Blank Page:

A blank page at this position is commonly used and prevents the following page from being visible.

Declaration:

A statutory declaration is required stringently. The wording is:

“With this I declare that the present *Master/Diploma Thesis, Project Report* was made by my self. Prohibited means were not used and only the aids specified in the *Master/Diploma Thesis, Project Report* were applied. All parts which are taken over word-to-word or analogous from literature and other publications are quoted and identified.

Kassel, (date of delivery & signature)

For Project Reports a shorter form can be used:

“I declare that the present Project Report was made by myself with use of the named aids.

Kassel, ... (date of delivery & signature)

Foreword / Acknowledgement / Dedication:

A foreword is recommended if there are special attendant circumstances. It can also be performed by means of an acknowledgement. Pay attention to completeness and relation to the work. Hymns of praise should be avoided. Dedications in project reports are unusual but not forbidden. Generally, a “curriculum vitae” is inappropriate.



Formulation of the Task:

The formulation of the task is the original paper obtained from the department or supervisor in order to assign the work.

Abstract:

The abstract of the work is included in advance to the actual report. It includes a short overview of the performed work. The length should be about one page but not more than two. Do not write a “verbalized table of contents” but a representation of the crucial points and the main results. In particular, the following points should be included.

- ☞ Meaning and intention as well as the motivation of the work.
- ☞ State of the art, deficits in existing solutions and approaches.
- ☞ Outline of the own approach, advantages and shortcomings.
- ☞ Description, analysis and interpretation of the yielded results.
- ☞ Assessment of the own results compared to previous results.
- ☞ Conclusions of the results and outlook to further activities.
- ☞ Final statement or evaluation of the realised approach.

Table of Contents:

A meaningful structure of the work is reflected in the hierarchy of the table of contents. It is advisable to print the main chapters bold in order to contrast with sub chapters. Subdirectory should be listed only up to the third level. More levels are confusing. Page numbers are strongly recommended.

For instance a table of contents may look like this example:

4. Interpretation of results	77
4.1 Analysis of the simulation results	8
4.1.1 Simulation with Parameter $p = 0,5$	79
4.1.2 Simulation with Parameter $p = 0,7$	82
4.2 Analysis of the Measurements	88
4.3 Comparison of Simulations and Measurement Results	94

Introduction:

The aim of the introduction is to lead the reader to the subject of the work. Accordingly, a short outline of the specific problem with regard to approaches and research in the past is meaningful. Don't use any empty phrases. The following essential points should be included.

- ☞ Motivation of the work, comprehensive description of the problem and the background as well as references to previous approaches and solutions.



- ☞ Own interpretation of the task. A division of the overall work into subtasks should be outlined.
- ☞ Description of the own approach. Why is this approach applied in the present work? It should become clear that the student has an idea about a purposeful strategy in order to work on the task.

State of the Art:

In this chapter an overview about currently available solutions and approaches should be given. It is related to previous work at the university as well as to external work with similar subject. The main focus of this chapter is an analysis of the state-of-the-art. Due to the variety of subjects in Diploma, Master and Project work (hardware, software or theoretical work) the contents of this chapter may differ from each other.

For instance, in simulation and modelling work a compilation of the theoretical basics is advisable. As an remark, it is not necessary to derive Ohms law. Many relations are well known from literature and hence a reference to the concerning publications is sufficient. Whereas the recent work of relevant subjects in current publications should be discussed in more detail. Here, it can be meaningful to present the own work, which has been done already in this field. In this case, the result of this chapter should point out new approaches and improvements which are explained in the next chapter.

Assumptions and simplifications have to be justified. In the case of a hardware work, a structured description of the particular components is required in this chapter (design of the components, measurement results, physical and mathematical background).

Presentation of the Own Approach:

Generally, this chapter is the most extensive part of the report. Thus, it should be well structured and thoughtful. Based on the explanation in the previous chapters (deficits, own approach) the own concept is presented in this chapter. In most cases the issues of scientific work are innovations. Therefore, it is not appropriate to go like a bull at a gate. It's rather advisable, to take a well understandable and comprehensible way in order to lead to the innovation. Basically, numerous figures, drawings (with complete declaring captions) and diagrams are helpful to explain complex subjects.

Problems which occurred during the work as well as solution strategies (e.g. essential assumptions and simplifications) have to be documented and justified in any case in order to allow further work in this field. Reports about software development without a minimum of documentation (comments in the source code) will not be accepted. In hardware reports the main focus of this chapter is on the description of the interconnection and on the adjustment of the individual components. The whole systems should be characterised e.g. by means of measurements. Furthermore, a comparison between measured and simulated (or calculated) system characteristics is possible. In software reports a detailed description of the software particularly with regard on installation, usage and maintenance is expected.



Results / Discussion / Analysis:

The main part of the last chapter was the operation of the whole system. Now the focus is on the verification of the performance of the system. Since this is often a test of a prototype, the performance should be discussed very carefully. Deviations from the expected behaviour should be mentioned and explained as far as possible.

In hardware reports a description of the system performance follows. The properties which are determined by means of measurements have to be analysed and documented with respect to relevant constraints or boundary conditions. In software reports the simulated results should be compared with measurements if possible. An assessment of the modelling should be made and basic approaches for improvements should be given. In particular, limits due to hardware, computation time, costs, field of applications, uncertainty, etc. should be outlined. Default settings must be specified. Further, the own work has to be reviewed with regard to previous approaches and the conceptual formulation. In many cases it is possible to say something about mutual influences of input parameters and which settings cause the system to operate at its limits. Such information is helpful for the user and allows a reliable application.

At this point, it is mentioned that problems during the work and “bad” results do not necessarily result in a low grade of the work. Even “bad” results may show that the used approach is not suitable, or certain assumptions and simplifications are not valid. In any case, it is very important to explain an expected or unexpected system performance very consistent. Finally, the results of this chapter are used to evaluate the system with respect to several points of views (e.g. efficiency, reference to reality, effort, accuracy, stability with regard to varying boundary conditions, etc.).

Conclusion and Outlook:

Together with the introduction this final chapter is the frame of the work. It includes essential results of the work as well as important remaining questions. For this purpose substantiated hints, approaches and suggestions for further work are expected. Furthermore, special hints for an alternative use may be given.

Bibliography:

A sorting of the literature sources is not required, but it is meaningful to arrange the particular items in an alphabetic order of the last name of the author. Another possibility is to arrange the items in order of appearance in the text. The literature sources are listed due to the following scheme and example:

[index] author(s), title of the book/paper (poss. cursive), poss. title of the magazine (in case of conferences: location), issue, volume/year, page numbers

The index is a serial number. As an alternative, the index can be combined by the first three letters of the author name and year of publication (last two digits), e.g., in the form of [Sem04]. It should be mentioned that many office software tools (e.g. Staroffice) provide administration plug-ins for automatically generation of a bibliography.



List of Figures and Symbols:

A uniform usage of parameters and symbols in the whole work is strongly recommended. If equations are used (please use the equation editors of the office software tools or the equation editor „MathType“, respectively) all quantities must be specified subsequently. For a large number of symbols, a recurrent explanation of the symbols is very laborious. Therefore, only essential symbols should be listed below the formula and a separate sheet with applied symbols should be created according to the following scheme.

a_i	<i>random amplitude factor</i>
$a!$	<i>factorial of a</i>
A	<i>amplitude of the signal $s_0(t)$</i>
b	<i>constant factor</i>
B	<i>bandwidth</i>
c	<i>speed of light $c = 3 \times 10^8$ m/s</i>
...	

A list of figure is not obligatory. It's merely necessary in order to find certain figures more quickly. A list of figures may look like this.

Fig. 2.4	<i>Trend of the costs for development of vehicle supply.....</i>	<i>12</i>
Fig. 2.5	<i>Course of the voltage on short overload condition.....</i>	<i>14</i>

List of symbols as well as list of figures may be placed directly behind the table of contents. When many non-familiar technical terms are used, a list of abbreviations is advisable:

ACC	Adaptive Cruise Control
CAN	Controller Area Network; Communication network for linking Micro-controller nodes in automotive applications

Appendix:

Additional things which would lead to digressions in the context of the work can be included in the appendix (e.g. derivation of certain relations, further results, data sheets, component list, flow charts, etc.). Important: the printed source code of software works (listings) doesn't belong into the appendix. It should be delivered on a CD-ROM or as an additional document if necessary. Exceptionally, parts of the source code may be included into the thesis in order to illustrate essential algorithms.

Enclosure:

The enclosures are the attached data media (CD-ROM) with the complete document, images and an abstract of the diploma thesis in electronic form. In case of a software project the current version of the software, i.e., the source code, the executable files and free- and shareware tools should be attached as well. Usually, they are in a cover which is stuck onto the inner surface of the backside hard cover.

**Further Hints:**

Besides the criteria in the previous chapter, further hints must be taken into account during the preparation of the written report.

- ☞ Generally, the work should be written in a style that avoids problems during reading.
- ☞ The report should be understandable without colloquial terms (slang) or too much complicated sentences. (Start explanations with simple considerations and proceed to more complex structures).
- ☞ A “central thread” should guide the reader through the thesis, i.e. the form and content of the work should be well structured. The reader must have the impression to read a “closed work”.
- ☞ Avoid mental leaps, explain the background.
- ☞ Avoid very long sentences as well as a style of the tabloid press.
- ☞ Theoretical fundamentals should be outlined in a convincing way. It must become obvious that the background was understood.
- ☞ The outer form of the report must be appropriate.
- ☞ An accurate reference to the literature is absolutely necessary, if already published facts are used (even at formulas).
- ☞ The thesis should be compared with the formulation of the task regarding completeness of work and documentation.
- ☞ First-person narrative should be avoided (except for acknowledgement and declaration).
- ☞ Pay attention of spelling, punctuation, and correct English.
- ☞ Figures and descriptive examples are in many cases more helpful for clarification than longsome written explanations.
- ☞ Figures and tables have to be provided with captions in such a way, that the figures are self-explanatory.
- ☞ Equations have to be numbered and all used symbols must be specified subsequently. When Equations are used with a large number of symbols, only essential symbols should be listed below the formula and a separate sheet with applied symbols should be created.
- ☞ Headlines have to be marked (e.g. by different font sizes) according to the hierarchy.
- ☞ Headlines of main chapters should cover the following sub chapters. However empty titles like “Measurement” or “Simulation” should be avoided.



- ☞ Not commonly used technical terms should be defined after the first appearance.
- ☞ Introduce new terms only, if there are no existing notations.
- ☞ Avoid forward references within the thesis, backward references are allowed.
- ☞ Headlines on every page with the title of the concerning chapter contributes to more clearness.
- ☞ Pay attention on a complete and sufficiently large axis labels.
- ☞ References to equations have to be enclosed by brackets (for example „... as you can see from equation (2.3) ...“). References to the literature have to be enclosed by square brackets (for example „... like mentioned in [1, 4-6] ...“).
- ☞ References to chapters, figures and tables are included by using the associated numbering in the text.
- ☞ A large number of pages doesn't implicate a high grade.
- ☞ The number of pages is not bound to a certain value. The actual number of pages rather arises automatically during writing the report in consideration of the hints of this guideline.
- ☞ Better ask the supervisor than make any changes afterwards!

Good success when writing the report!



III Seminar Report

In conclusion of a diploma or project work and after submitting the written thesis an oral presentation is to be given. The candidate shall represent and maintain his work to the professors, assistants and other colleagues of the department and shall comment on possible lack of clarity. Holding an oral presentation in the framework of a diploma thesis (approximately 30 minutes) is essential for grading the work.

Such a talk is in the interest of the candidate (experience in oral presentations is expected in industry, open questions to the written thesis may be clarified) as well as in the interest of the assistants and the other students (information about actual work of other working groups, possibility of fruitful discussions).

Presentations have to be designed using MS-PowerPoint. This should guarantee re-usability of the presentation results. An appropriate PowerPoint draft is available at <\\FSG-SERV1\\STUDENTEN\\VORLAGEN\\FSG-PRÄSENTATION.POT>, which is located at the server of the department.

Interim Report:

In addition of the seminar report the candidate informs in form of a short oral presentation on the actual state of the work every two month (approximately 20 minutes). This can be done with printed graphs, sketches or at the computer; it must not be worked out formally. The basic idea of an interim report is for instance to inform on the actual state, to discuss problems which came up and are not solved so far and to give hints or goals concerning the remaining working time. Fixing a date for seminar and interim report in time is recommended.

Since not all students have extensive experience on the field of preparing and carrying out an oral presentation, some hints are given in the following.

Preparing a Seminar Report:

The talk should follow textual and in the structure the written thesis. This means not at all that all of information included in the thesis should appear in the talk. Important for the talk is the clearly recognizable consideration of the following main areas.

- ☞ Presentation of the subject (plus a structure of the talk) and its arrangement in the respective field of research
- ☞ The motivation for the work (as introduction) and state of the art
- ☞ Procedure and central problems at the treatment (details hinted only)
- ☞ Results of the work, their interpretation and implications
- ☞ Conclusions, summary and outlook

In view of limited time (interim report: max 20 minutes, seminar report 30 minutes) a maximum number of slides of about 15 or 25, respectively, has proved to be favourable.

If the subject is not pure electrical engineering, a short general overview can be given; under no circumstances this should lead to the loss of the essential subject in the centre of the talk.



Presenting the Seminar Report:

Some "golden rules" are to be applied.

- ☞ The title of the work should come up at the beginning (appropriate slide designs or PowerPoint drafts are available at our department).
- ☞ Distinct pronunciation, face to the listeners.
- ☞ Unintentional forgetting of essential points can be avoided by short notes; do not read total sentences from your notes.
- ☞ It is hard to handle but hands out of the trouser pocket.
- ☞ Do not lean against projector or desk.
- ☞ Graphs and graphic illustrations are more suitable for talks than formulas (exception: If formulas are essential for explaining important relations).
- ☞ Put your overhead transparencies into right order before starting the talk.
- ☞ Choose a sufficient size (min. 16) of fonts (especially at axes of graphs) and details of pictures; For orientation: If text on a viewgraph lying on the ground can be read clearly by a standing observer or details can be recognised correct, the projection will be of sufficient resolution.
- ☞ Do not overload slides with text (not more than 5-7 main topics or max. 100 letters on one slide); the listeners can not read all anyway; better are short notes and more oral explanations.
- ☞ Do not read the text from your slides. Try to explain the slides by your own words, i.e. varying from the text on your slides.
- ☞ Speak fluently, not hectic.
- ☞ Use arrow or pencil on the overhead projector or pointer (laser pointer) at the screen.
- ☞ Do not play with pencil or pointer (nerves the listeners) and beware of walking around when talking to the audience.
- ☞ Use clearly arranged, expressive, and straightaway understandable graphs only.
- ☞ Explain acronyms and abbreviations used on your slides.
- ☞ Give the most precise and most complete information available (assumptions, conditions).
- ☞ Flow diagrams are useful only if explained in the talk.
- ☞ Put your overhead viewgraphs not into transparent cover.



- ☞ Do not fall back on things that are possibly unknown by the listeners (technical terms and abbreviations).
- ☞ Keep the limited time for talk (criteria for grading the report).

The explanation of very detailed problems should be avoided (indicated only). It is essential to get straight in ones mind, that most of the listeners hear the talk the first time and see the graphs the first time. The information overload is tremendous during the 30 minutes talk time; it should not be enlarged by unnecessary detail information (the listeners who are interested in special details will ask anyway). This especially is valid for diploma work done at the industry where little previous knowledge is available by the listeners.

In between and after the talk some questions of the listeners will arrive. These should be answered immediately - if possible - briefly and precisely. They can be a starting point of further discussions. Now and then, it is required to show certain slides a second time, therefore the slides should not be mixed up.

It is advisable in any case, to discuss the content of the talk with the supervisor in advance. The provisional "end version" of the talk should be checked critically against this guideline. If there is any lack of clarity the assistants are available as contact.

Enjoy preparation and holding of the oral presentation, and good success!