Guidelines on the form and content requirements for a term paper/internship report or thesis in the courses of Prof. Dr. Steffi Wiedemann[1]

1. General information

The aim of scientific writing is both to train and to verify your ability to perform independent scientific work.

Thus, you are expected to be able to address a scientific question within the module's scope and contents, to analyze it and to determine ways of finding a justifiable solution within the given time frame and to the specified extend. In addition, the scientific paper serves as proof of your ability to independently deal with questions, methods and the state of research on a specific topic in factual and linguistic terms. Use academic language in all papers. You can get an idea of an academic writing style by reading academic journal articles and textbooks which you will find in the library. Your writing style has to be objective, precise and concise. Avoid slang and colloquialisms.

Please contact me to agree on the topic of your work either in person or by e-mail.

2. Layout:

- Font: 12 pt Arial or Times New Roman
- Line spacing: 1.5
- Justification: full for the text, center for the title page
- Margins: right and left margin: 3.0 cm, top and bottom margin: 2.5 cm
- Pagination: number pages from the introduction on; preceding pages are numbered with lower case Roman numerals (not on title page; start with ii, iii, iv, etc.)
- Use design elements (bold, italic, underline) sparingly
- Units: SI units, eg https://physics.nist.gov/cuu/Units/index.html
- Nomenclature: use scientific nomenclature, eg. if your work is about dairy cows: give the scientific name when you first mention the species in the introduction in brackets such as dairy cow (*Bos taurus taurus*); see also https://www.britannica.com/science/nomenclature
- Footnotes: 10pt, single spaced, left justification. Annotations (full sentences) and references end with a full stop.

[1] Please be aware that the form and requirements may differ in courses of other lecturers.
Parts of the guidelines were copied with permission from: Wichern, F., Watson, C., Darr, D., Schmidt, R. (2013). *Guidelines for writing a scientific paper.* Hochschule Rhein-Waal, 19.11.2013.

- References: Alphabetic order, single-spaced, new paragraph between each reference, end with a full stop – see further information below.
- Logo: do not use the Rhine-Waal University logo; it's for officially released documents only

3. Deadlines and submission

- Deadline:
  - Term paper - will be defined for each module;
  - Bachelor or master thesis – please check general examination regulations of the Rhine-Waal University;
  - Internship/Practical semester report: 8 weeks after finishing the internship.
- Save the term paper and internship report in this way: Course-Semester-Year-LastName-firstname-assignment.pdf; eg. SAG_29.3-WT-2017-Doe-John-Term_paper.pdf
- Submission
  - Term paper either via moodle or via mail – will be specified for each course
  - Internship report together with the company's certificate of attendance or other confirmation documents via Sharepoint online tool (https://sharepoint.hochschule-rhein-waal.de/sites/Praxissemester/SitePages/Homepage.aspx)
  - Thesis: check general examination regulations of the Rhine-Waal University of Applied Sciences about when, where and what to submit

4. Length

- Term paper: will be defined for each course
- Bachelor thesis or Master thesis: contact me or check examination regulations of your study course at the Rhine-Waal University of Applied Sciences
- Internship report: 15 – 20 pages
- The required number of pages only includes the following parts: introduction, material and methods, results, discussion and conclusion.

5. Structure

- The scientific report should consist of:

Structural elements	Term paper	Master or Bachelor's thesis
Title page / cover	Yes	Yes
Abstract / summary	No	Yes
Table of Contents / Outline	Yes	Yes
List of abbreviations	Yes, if used	Yes, if used
List of figures/tables	Yes, if included	Yes, if included
Main Body	Yes	Yes
Conclusion	Yes	Yes
Bibliography / List of references	Yes	Yes
Appendix	Optional	Optional
Declaration of Authenticity	Yes	Yes

Title page

- Centre the text on the title page, use standard font size and lining
- Top portion of the page
  - Title of your paper
    - Your title should be very specific, indicating the actual main point of your paper, not just its overall topic.
    - Capitalize the appropriate first letters, but do not underline, italicize, or use bold or oversize type
- Roughly the middle of the page:
  - Title of the course/seminar, name of lecturer
  - Rhine-Waal University of Applied Sciences
  - Faculty of Life Sciences
  - Study course (Sustainable Agriculture, Agribusiness, Biological Resources, etc.)
  - Author(s), student ID number, e-mail (official student mail address)
  - Date of delivery
- Internship report only: please also include the name and address of the company and the duration of the internship

Abstract/Summary

- Only in bachelor or master theses or in scientific papers
- A "mini" version of your report (comprising introduction, objectives, methods, results, conclusions)
- Cannot exceed 250 words
- Optional: number the abstract page with a lower case Roman numeral (eg. i)

Table of Contents

- List all headings and subheadings with page numbers. Do not exceed 3 levels (sub-sections).
- Optional: number the abstract page with a lower case Roman numeral

Table of Contents

Figure 1: Example Table of Contents

Introduction, including literature review and objectives of the paper

General structure: problem statement or opening paragraph, review of literature, summary paragraph and statement of hypotheses or research questions

Problem statement

- Should give orientation to the reader and make them want to read the rest of the report

- In general: A short description of the general importance of the issue; a general statement about what the literature has found; a statement of the goal of the paper, questions to be answered or literature to be reviewed in detail later or your hypothesis (if applicable), etc.; alternatively it can also explain your motivation to study a particular question and/or a general statement of the study approach
- Includes:
  - Placement of the specific topic in the broader context
  - Very short overview of current state of research (incl. controversial issues), sources or your motivation
  - Explanation of relevance for scientific discourse (if applicable)
  - The objectives of your investigation should clearly be stated here. What do you want to find out? Which concrete question(s) do you aim to answer? Your objectives must complement your conclusions. Each of your conclusions should correspond with one objective. For this reason, although objectives are presented at the end of the introduction, they are often written after the conclusions have been written!
  - Brief sketch of how you want to approach the topic (method and content), guiding the reader and awakening curiosity to and about what lies ahead.
  - If necessary, clarification of terms / definitions
- Should not exceed 1.5 pages

<u>Literature review</u>

The Literature Review provides a more detailed analysis of existing literature and shows how this literature informs your research, and how deficiencies in this literature provide a motivation for your research.

- Briefly summarize the findings of researchers who have carried out work relevant to yours without repeating their methods etc. in detail. Lay the basis for answering your research questions.
- Use reasonable (sub)headings to structure your introduction
- In theoretical papers, systematic reviews or metaanalyses the literature part is often used to give a basic understanding of the topic.
- All information that you took from work of other authors used in this part and later on needs a reference otherwise it could be considered a plagiarism. This applies to literal as well as analogous quotation of text, ideas and data (see below). If further

comments seem necessary, but would disrupt the fluidity of your text/argumentation, put them in a footnote.

- The literature review can also be used to derive hypotheses for your investigation. If your paper is empirical, the introduction should take up between 30% and 50% of the paper.

> ➲ *Are you conducting **empirical research**? Read on. Are you writing a **theoretical paper or a systematic review**? Continue reading on page 7.*

Materials and Methods (empirical)

- This section precisely explains how you have conducted your investigation and collected your data, in order to allow other scientists to replicate and validate your work.
- For investigations in the field of natural sciences and technology this often includes treatments, design, apparatus, and data collection.
    - If you have followed a published method, you need only refer to the method and detail any modifications you carried out
    - Provide background information on sampling sites or farms (number of animals, location, time of year, weather conditions etc.)
- For studies in the social sciences this may include a description of the study area and why it has been chosen, research tools, questionnaire design, data sampling approach, etc.
- In this section you also need to provide details of how you analysed your data (e.g., software used, statistical tests performed, etc.)

Results (empirical)

- This section presents the findings of your work. Language should be clear and concise. Repetitions and unnecessary “filler words” should be avoided.
- In this section, the findings of your work should be described but should not yet be interpreted or discussed in detail.
- Besides in the text, major results can also be presented in tables and figures. The reader should be able to understand the content of any table/figure by reading its title without reading any other text.

- “Unnecessary” data (e.g. calibration graphs, additional information on animals) should be put in an appendix.
- Formatting of tables and figures should adhere to the following standards:
  - Titles are placed at the top of tables and at the bottom of figures.
  - Units must be provided correctly and in accordance to the standardized Systeme Internationale (SI).
  - Figures should have clearly labelled axes (including the units). Error bars should be provided if useful to improve the understanding
  - Tables should indicate levels of significance of data presented. If useful to improve the understanding, standard errors or least significant differences should be indicated

Discussion (empirical)

- This section provides an interpretation of your results. For studies in the social sciences it is not uncommon to merge the “Results” and “Discussion” sections into one.
- Explain relationships and generalizations supported by your data. Draw particular attention to statistically significant differences in your results.
- Relate your results to the findings of other researchers mentioned in your literature review. If your results differ state possible reasons for the difference, e.g. use of different breeds in your study, limited number of animals, other method used, etc.
- If you have formulated hypotheses, you should also compare the results with your initial hypotheses.
- Properly address difficulties/unexpected results.

Materials and Methods (theoretical)

- This section precisely explains how you have conducted your investigation and collected your data, in order to allow other scientists to replicate and validate your work.
- Describe the criteria according to which you selected journals, books and other sources in order to answer your research question. If you have excluded certain sources, explain the reason why (for example if you only considered articles which

have been published less than 5 years ago or studies that had a certain experimental set-up).

- Describe your procedure: which data bases or search engines did you use to look for literature? Which search terms or key words did you use and how many results did you get? How did you proceed to make a final selection? Here, you also need to justify why the literature you did not select did not meet your criteria.
- How many sources and experiments did you finally choose to include in your paper? A table as an overview can be helpful here, for example with the following columns: source, how many experiments, which control group, a short description of the samples and a short description of the treatments. Of course this information should match your topic.

Results (theoretical)

- This section presents the findings of your work. Language should be clear and concise. Repetitions and unnecessary “filler words” should be avoided.
- In this section, the findings of your work should be described but should not yet be interpreted or discussed in detail.
- Structure the results according to your research questions and make this structure clear by using appropriate headlines for the sub-chapters.
- Describe the selected studies in more detail and - taking your research questions into account - relate them to each other or distinguish them from each other. It is important to compare the different experimental set-ups. Discuss special features, deviations, etc. Always keep in mind that each result also depends on the method by which it was obtained and on the sample that has been analyzed.
- In order to structure your results clearly, you can summarize important information in tables (for example findings from different studies). Refer to these tables in your text. Make sure that the tables only display information that is relevant to answer your research question (do not depict all the results from the studies you read, but select what is really important).

Discussion (theoretical)

- The discussion is meant to answer your research question. Briefly summarize your most important findings, then interpret your results. Explain and justify your

interpretation, also cite the most important studies you are relying on and which help to understand your results.

- If possible, discuss alternative explanations and make clear what speaks for “your” interpretation/explanation of the results.
- What are the limitations of your research? What are theoretical and practical implications?

Conclusion

- Refer back to the problem posed, and describe the conclusions that you reached from your work, summarize observations and interpretations and state practical implementations.
- In this section you should not introduce any new facts or ideas that are not related to what you have been presenting before.
- Do not repeat word for word the introduction or discussion.
- You can also propose here what future work is needed to clarify various points that your investigation could not answer (e.g. encountered difficulties)
- The final chapter should not only give the reader the feeling that it was worthwhile to read your paper, but it should also stimulate further thinking.

References

- This section provides the list of other research works and sources that you have used to conduct your investigation and elaborate your scientific paper.
- In the references you list all works cited in your paper according to the styles listed below. A paper with ≤10 pages should contain at least five references to research articles or monographs, a paper with >10 pages at least ten. Use only scholarly sources (printed or from the Internet).
- Any fact, idea, table, figure or other item that you have taken from other sources should be clearly highlighted as such in your text by providing the reference directly behind the fact or idea (example see below). The reader should be able to clearly see which part of your text is based on your own thoughts, and which ideas have been taken from other sources.

- In a scientific paper, scientific journals and books (both print and online) should be the most important sources of information. References should not only comprise internet sources (e.g. Wikipedia, blogs, websites of NGOs etc.) and "grey" (i.e., unpublished) literature.
- All references should be stated at the end of your report using the Harvard Referencing System (see below or http://www.citethisforme.com/harvard-referencing).
- All literature sources used in your paper should appear in this section – and all references listed in this section should be used in your text.

How to cite in the text:

- Direct quotations (copying a statement word for word) require to be set in quotation marks. In general, "Education is the most powerful weapon which you can use to change the world." (Mandela, 2012)."
- Try to avoid these direct quotations, and rather reformulate the central ideas in your own words.

  Darwin (1859) suggested that evolution occurs by means of natural selection. OR

  Evolution occurs by means of natural selection (Darwin 1859).

Books:

- Name of the author(s) or institution (Year): Title and subtitle. Location, i.e. City and country: Publishing Company.
- Example:

Gillespie J. G., Flanders F. (2015). *Modern Livestock and Poultry Production.* 9th edition, Clifton Park, NY: Cengage Learning

Articles:

- Name of the author(s) or institution (Year): Title. Name of journal, Volume, Issue number, pages.
- Example:

Knapp, J. R., Laur, G. L., Vadas, P. A., Weiss, W. P. and Tricarico, J. M. (2013). Invited review: Enteric methane in dairy cattle production: Quantifying the opportunities and impact of reducing emissions. *Journal of Dairy Science,* 97(6), pp. 3231–3261.

Polsky, L., Keyserlingk, M. A.G. (2017). Invited review: Effects of heat stress on dairy cattle welfare. *Journal of Dairy Science* 100(11), pp. 8645–8657.

Websites:

- Name of the author(s) or institution (if available: Date of publishing): Title. [online] Complete URL, i.e. uniform resource locator [Date of your last access].
- Example:

FAO.org. (2017) *Livestock and Environment*. [online] Available at: http://www.fao.org/livestock-environment/en/ [Accessed 31 Oct. 2017]

Declaration of Authenticity

Please attach the following text:

Declaration

I, First Name Name, declare that the research work presented here is from the best of my knowledge and belief, original and the result of my own investigations. The cooperation I got for this research work is clearly acknowledged. To the best of my knowledge, it does not contain any materials those are written by others or published already except mentioned with due references in the text as well as with the quotation marks.

This work has not been published, submitted, either in part or whole intended for reward, degree at this or any other University.

Kleve, Date *Signature (in term papers the name is sufficient)*