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Thesis Writing

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1. Before you start writing
 2. Guidelines and Tips
 3. Nine steps in developing a draft manuscript
 4. Checkpoints to consider
 5. General advice
 6. The best part of thesis writing
- Appendices: Literature, webpages, writing tips

Before you start writing

Defining your topic

- + *Width of topic.* Broad enough to address an important and interesting issue, but narrow enough to address the issue in the time allotted.
Watch out: Your topic seems to get bigger once you are in it!
- + *Understand the limitations of your situation* (your capabilities, motivation, experiences, additional classes to be taken, supervision, required labwork, dependence on others, etc.)
- + *Do some previous readings.* Make sure you understand at least roughly what you are getting into. Study the state-of-the-art of the issue.

Before you start writing

Creating a timetable

- + *Coordinate with your other commitments.* How many hours per time unit can you effort? Discuss the timetable early enough with your advisor. He/she may have experiments, travel or other activities on his/her mind which you should know.

Reading strategies

- + *Understand that you are not going to know exactly what you are looking for in the beginning.* Research is not fully planable.
- + *First read to explore.* Then read to focus. Finally read to understand all the details of previous relevant work.
- + *Read critically.* Research is not about believing, but about asking questions. Try to get to the primary sources. A topic may be misinterpreted by secondary sources.
- + *Read always* – you can never do enough reading! This holds especially for a PhD thesis: You should finally know more about your topic than anybody else, including your advisor!

Before you start writing

Writing as you research

- + *As you read, take notes* (summaries, short reactions). As you research and experiment, write things down. Keep a journal and list everything what you do related to the topic. Very often you will publish one or more papers before you complete a PhD thesis anyway.
- + *Take advantage of other people's writing skills and experiences.*
If you have experienced co-authors - like your advisor(s)-, learn by doing!
A good co-author is a very valuable teacher.
- + *Writing helps focusing and clearing issues.* You may have good ideas in your brain, but only when you write them down you will notice what is missing, etc. Also, it is very helpful to explain things to others early in the process. This may lead to useful feedbacks.

Before you start writing

Presenting as you research

- + *Presentations are another means for shaping your thoughts* and getting input from the outside world. This is part of the larger issue of communication. Doing good research is one thing – communication it properly is another one.
- + *Presentations should be started in your own group.* Don't be afraid - your colleagues are in a similar situation. Together you will robustify your presentation and public discussion capabilities, before you encounter a larger, international audience and possibly some very critical „big-shots“.
- + In many places the *defense of a Master or PhD thesis also includes a presentation and public discussion.* Be prepared for that!

Guidelines and tips (modified after Chemical Engineering and Advanced Materials, University of Newcastle Upon Tyne)

Layout

Presentation format. Dictated by institutional guidelines.

- Sizes of page margins and line spacings
- Formats of title page, list of contents, appendices, list of references, illustrations, figures, tables
- numbering system of chapters and sections, pages, figure and table captions, equations
- font-styles for chapter and section headings, other text, figure and table captions, equations, quoted work, citations
- how references are cited
- how tables, figures and equations are cited

Tips:

Find out early enough about these regulations. It saves time.

Places: Library, student office, graduate school, advisor.

Get hold of a thesis written by another student of your Department.

Guidelines and tips

Structure

Organization of chapters or sections. No fixed regulations, but certain rules:

- **Title page** (full title and subtitle, name of author, statement about degree program, date of submission)
- **Abstract** (objectives of work, methodologies used, main findings).
Should be self-contained.
- **Contents list** (chapters and sections with page numbers)
- **List of tables, diagrams and illustrations** (figure and table numbers, with captions and page numbers)
- **Nomenclature list** (nomenclature and acronyms used)
- **Acknowledgements** (contributions of advisors, colleagues, sponsors, friends, etc.)

Contd.

Guidelines and tips

Structure

- Main text

- + Chapter introducing the research (motivation, objectives, methodology, overview)
- + Chapter reviewing the work that has been done before
- + Chapter or two describing in detail the methodology adopted or proposed
- + Chapter or two presenting the main results of the work
- + Concluding chapter, summarizing the main findings, statements about the main contributions and recommendations for future work
- References (list with refs cited in the thesis)
- Appendices (parts which would disturb the flow of reading: Well-known facts, lengthy derivations, sample calculations, long tables, background information)

Tips:

Spend enough time planning the structure

Get copies of other (good) theses. Talk to your advisors.

Write abstract and introduction chapter last

Guidelines and tips

Flow of contents

Writing a thesis is like writing a novel: There must be some internal logic.

Confusing sentences will make the reader give up very quickly.

And the examiner will react with low marks!

Tips:

- + Avoid repetitions (copying your own sentences several times)
- + Avoid copying other people sentences. Develop your own style.
- + Maintain thread between adjoining chapters („joining“ words/sentences)
- + Define all variables in equations and in calculations. Use variables according to general practice. Don't use the same variables for different things.
- + Describe test and computational conditions. The reader usually is not familiar with your facilities.
- + Leave out material that does not contribute directly to the discussion or development of an idea.

Contd.

Guidelines and tips

Flow of contents

Tips:

- + Avoid long and complex sentences. The matter may be complex enough – describe it in simple terms.
- + Apply punctuations correctly
- + Do not repeat certain words too often and too close together. Use a thesaurus to introduce variety in expressions. Avoid bombastic words. Avoid rarely used vocabulary and do not generate your own words.
- + Writing in the „active voice“ improves the reading pace and dynamics.
Active: Parameter (a) improves the performance of the algorithm
Passive: The performance of the algorithm is improved by parameter (a)
(Active expressions are more assertive!)
- + Illustrations and diagrams are very important. Use them in the right place and such that they are readable in terms of graphic style and explanations of variables.

Guidelines and tips

The „Abstract“

Provides the reader with a summary of the contents.

It should be brief, but contain sufficient detail: Motivation of work, objectives, methodologies employed, main results and conclusions.

Abstract should be self-contained.

Tips:

- + Write the abstract last!
- + Use „punchy“ style to attract reader.

Guidelines and tips

The „Introduction“

Discuss motivation for the work. Define the problems that you wish to attack. State briefly state-of-the-art of the research issues and objectives of the work. Give indication how the work will progress. Provide overview of the thesis contents.

Tips:

- + Write the Introduction last!
- + Do not repeat the sentences from the abstract
- + Use „punchy“ style to attract reader.

Guidelines and tips

The „Literature Review“ (previous work)

State why the problem of the thesis is important. Describe what others have done. Set benchmarks for your own project. Justify the use of specific methodologies in your work.

Tips:

- + Concentrate on most important publications. Use primary literature.
- + Keep it confined to topics really relevant to your own work.
Don't try to show off by citing too many authors.
- + Make sure you do not miss the latest developments.
- + Science is international. Check the international scenery.
- + Make sure you understood what you have cited!

Guidelines and tips

The „Conclusions and Recommendations for Future Work“

Some people only read abstract, introduction and conclusions. So make sure these three chapters are internally consistent and conclusive.

Contains: Summary of main findings, critical analysis of results, what is really new? where did you achieve progress? directions for further research.

Tips:

- + Check if the project objectives have been achieved and if not, explain why.
- + Clearly distinguish your own from other people's work.
- + Present your conclusions and contributions concisely and factually.
- + Write in a „punchy“ style, but don't claim things you did not achieve.

Nine steps to developing an efficient draft of your manuscript (modified after San Francisco Edit, www.sfedit.net)

- 1. Consolidate all the information.** Ensure that you have everything you need to write, e.g. all data, references, drafts of tables, figures, etc.
- 2. Start writing.** Write when your energy is high. Try to find a time and place where you can think and write without distractions.
- 3. Write quickly and in larger portions.** Keep the flow going. The first version does not have to be perfect. Leave gaps if necessary, search for correct words, data, figures, etc. later. Do the editing later.
- 4. Write in your own style („voice“).** Avoid copying sentences from other authors, the reader will notice this.
- 5. Keep to the plan of your outline.** Avoid wandering around and meandering. Keep the red file, the reader must be able to follow you. Don't jump from issue to issue.
- 6. Write the thesis in parts.** Treat each section as mini-essay. Check if each section can stand alone.

Nine steps to developing an efficient draft of your manuscript (modified after San Francisco Edit, www.sfeddit.net)

- 7. Put your first draft aside.** Let it rest for a few days or even longer. Fresh reading will give you additional insights into and critics of your own text.
„Good things need time“!
- 8. Revise it.** This may have to be done several times. Let a colleague have a look at it. If your control of the language (English!) is not sufficient have somebody (expert) proofreading it.
For detailed checking see section **Checkpoints to consider!**
- 9. Target a journal.** Thesis work should also be published in journals. Define your content in relation to the goals of the journal. Consider the audience of the journal. Check several recent journal issues. Condense your thesis into manageable junk(s) for journal publication. Don't try to put everything into a journal manuscript.

Checkpoints to consider (1)

Introduction

- + Does it arouse interest or curiosity?
- + Does it include a thesis statement?
- + Does it include all the important goals and content statements?
- + What is the author's purpose in writing this thesis?
- + Does it show the attitude of the writer to the statement?
- + Does it give sufficient credit to previous work?

Checkpoints to consider (2)

Body

- + Does each paragraph have one main idea which clearly relates to the thesis statement?
- + Do the paragraphs come in logical order?
- + Does each paragraph contain enough specific details which expand or clarify the main idea of the paragraph?
- + Are transitions used between paragraphs to help the reader follow the train of thought from one paragraph to the other?

Checkpoints to consider (3)

Conclusions

- + Are they clearly related to the thesis statement and the body?
- + Do they develop from the material or do they seem forced and artificial?
- + Are the main points summarized briefly?
- + Be honest with the critical assessment of your own results. Don't try to pretend things which you have not achieved.
- + Are the perspectives clear and concise?
- + Don't forget to make clear and realistic suggestions for future work.

Note: Introduction and conclusions together should be self-sufficient!

Checkpoints to consider (4)

Generalities (1)

- + Is the wording appropriate and accurate?
- + Is the language acceptable (spelling, punctuation, grammar)?
- + Are the points presented in a coherent, logical order? Don't lose the red file! Concentrate on the essentials!
- + Do arguments flow smoothly & logically from one to the next??
- + Are arguments supported by appropriate examples?
- + Remember: Nobody should know more about the issue you are dealing with than yourself. Consider this in your text by explaining things carefully and clearly, but not too exhaustively!
- + Are references sufficient, not too exhaustive and relevant?
- + Pay credit to the earliest findings/developments (primary literature).

Checkpoints to consider (5)

Generalities (2)

- + Is the referencing consistent and in accordance with the author specifications?
- + Are sources acknowledged? Don't just copy other authors sentences and figures without referencing.
- + Are the pages numbered and are there indices?

General advice (given by MIT, modified)

A. Think of a thesis as a series of small related tasks

- + Do some research of the literature
- + Summarize and comment upon the literature
- + Perform experiments or/and do fieldwork
- + Write up the results from those experiments
- + Draw conclusions from what you have done
- + See how your results and conclusions fit with the literature
- + Put all these pieces together into a whole. Follow a format which your Department will give you or that you will find in a journal or a conference.
- + Edit your document carefully for content, format, spelling, grammar and mechanics
- + Consult other, more experienced people for help and support

General advice (2)

B. Do not think „I have to write a whole thesis!“

- + Stitch pieces together
- + Don't write one big piece at a time

C. Do not put off writing the thesis until the end

- + Start to write as early as possible, even if it is only your random thoughts
- + Any task that you are performing can be written about!

D. Try to write 15 minutes every day

- + Extensive notes, thoughts about literature, descriptions to yourself of an experiment you performed, thoughts about a project as a whole

E. Don't forget that you have written several successful documents before

- + Remember the errors you made before and learn from them

General advice (3)

F. You are not alone!

G. Don't isolate yourself during the thesis process

- + Discuss your fears, doubts and results (other students, thesis writers, faculty, advisors)
- + Share suggestions how to overcome obstacles

H. Take a course on Technical Writing

- + Writing is to a large amount a skill, which can be learned

I. Don't endure writer's block

- + Most writers get this occasionally. It is not a career-ending disease
- + Total block – partial block: Don't suffer through, get advice
- + Caused by „deadline anxiety“ – it gets worse

The best part of thesis writing

- + A rewarding experience
- + Challenge and opportunity to pursue an intriguing intellectual question in a stimulating environment
- + Work in close cooperation with experienced people (advisor(s), senior researchers)
- + Great feeling of satisfaction after completing the job

Literature

Kirkman, John. *Good style for Scientific and Engineering Writing*. London: Pitman, 1980.

Lannon, John. *Technical Writing*. New York: Harper Collins, 1991.

Michaelson, Herbert B. *How to Write and Publish Engineering Papers and Reports*. Philadelphia: ISI Press, 1986.

Murray, Rowena. *How to Write a Thesis*. McGraw-Hill, 2002.

Pauley, Steven. *Technical Report Writing Today*. Boston: Houghton Mifflin, 1988.

Rathbone, Robert. *Communicating Technical Information*. MIT Press, 1978.

Sternberg, David. *How to Complete and Survive a Doctoral Dissertation*. New York: St. Martin's Press, 1981.

Webpages (as of 23 June 2006)

- + www.sfedit.net
- + web.mit.edu/writing/_Types/writingthesis.html
- + www.dartmouth.edu/writing/material/student/thesis.shtml
- + www.io.com/hcexres/textbook/intro.html
- + lorien.ncl.ac.uk/ming/Dept/Tips/writing/thesis/thesis-intro.htm
- + www.rpi.edu/dept/grad/docs/ThesisGuide/manual.html
- + www.psy.gla.ac.uk
- + www.learnerassociates.net/dissthes/

Links to other academic writing websites (University of Canterbury, Computer Science Department)

Academic Writing

These websites cover academic writing in general.

http://www.cosc.canterbury.ac.nz/teaching/4thyear/technical_writing/

Q Manual

An excellent source for information on academic writing.

<http://www.buseco.monash.edu.au/publications/qmanual/index.html>

Scholarly Writing: A Case Study

A short story illustrating the process of writing a good essay. (A little out of date, but well worth reading.)

<http://www.studentservices.canterbury.ac.nz/awc/Resources/pages/Story.htm>

Explore Topics by Stages of the Writing Process

Complete information on academic writing.

<http://writing.richmond.edu/writersweb>

The UVic Writers Guide

Very comprehensive

<http://web.uvic.ca/wguide/>

Online Writing Lab

Instructional handouts and writing resources.

<http://owl.english.purdue.edu/>

The Writing Center at Brown University

Information on academic writing from Brown University, USA.

http://www.brown.edu/Student_Services/Writing_Center/toc.htm

Technical Writing

Covers the type of writing used in reports or manuals.

Online Technical Writing.

An online textbook for courses run worldwide by Austin Community College, USA.

<http://www.io.com/~hcexres/tcm1603/achtml/lettov.html>

Thesis & Dissertation

Websites that give information on thesis and dissertation writing.

Writing and Presenting Your Thesis or Dissertation.

A complete guide to thesis writing from Michigan State University, USA.

<http://www.learnerassociates.net/dissthes>

The Dead Thesis Society.

A student-organized thesis support group for those who have stalled with their thesis, due to a lack of motivation or to frustration.

<http://freewebhosting.hostdepartment.com/d/deadthesissociety/>

A Guide for Writing Research Papers.

Comprehensive guide to technical writing from Capital Community-Technical college, USA.

<http://webster.commnet.edu/mla/index.shtml>

Grammar and Style

Since the academic style is sometimes different to other styles,
it is a good idea to at least skim through this information.
Take note of the rules of academic writing.

Guide to Grammar and Style.

A good guide to the finer points of writing from Rutgers University, USA.

<http://andromeda.rutgers.edu/~jlynch/Writing/>

Lists of Grammar Lists.

Lists of grammar items from Georgia State University, USA.

<http://www.gsu.edu/~wwwesl/egw/grlists.htm>

Guide to Writing and Grammar.

Very comprehensive guide to academic writing from Capital Community College, USA.

<http://webster.commnet.edu/grammar/index.htm>

Writing Tips

(Chem. Engineering and Advanced Materials, Univ. of Newcastle Upon Tyne)

Updated: 13 January, 2006

This page contains links to material that should help you write up laboratory reports, dissertations and theses. They have been culled from various sources and are meant to be general guidelines rather than strict rules. You should always consult your project supervisor or module leader to clarify details.

Home Grown Advice

- [Writing Research Theses or Dissertations \(guidelines and tips\)](#)
- [Presenting Data](#)

Links to Writing Resources

- **Dictionaries**
 - [A Web of On-line Dictionaries](#) - claims links to more than 800 dictionaries in 160 languages
 - [Webster Dictionary Search Page](#)
- **Thesauri (?)**
 - [Roget's Thesaurus](#)
 - [Webster Thesaurus Search Page](#)
- [Dr. Jay's "Write" Home Page](#) contains loads of pointers and links to writing resources
- [Writing Related Internet Sites](#) is a collection of links to resources that will help you write better theses and reports
- Brush up your English grammar - visit the [Online English Grammar](#) site

Guidelines and Advice on Report, Dissertation and Thesis Writing

•Abstracts

- [What goes in an Abstract](#) - some tips from Education-line
- [Writing an Abstract](#)

•Technical Reports and Papers

- [Structure of a Technical Report](#) - guidelines on technical report writing by Dr. William Easson of Edinburgh University
- [Technical Writing](#) - an online book

•Thesis and Dissertations

- [Dissertation Advice](#) from Syracuse University
- [Final year projects](#) - practical advice from Prof. Mike Hart on how to write up your final year project, dissertation or thesis
- [Report and Thesis Layout](#) gives pointers on how to enhance the presentation of reports and theses
- [The Thesis](#) (advice from Uni. of Illinois, Urbana-Champaign)
- [Writing and Presenting Your Thesis or Dissertation](#) (by S. Joseph Levine)
- [Writing your Thesis: A Survival Guide](#) by Dr. Suzanne Barker-Collo

•References and Bibliographies

- [Citation and Style Guide](#)
- [Citing Electronic Resources](#)
- [Citing Internet Sources](#)
- [Citation using the Harvard System](#) - the fuss free way (IMHO)
- [Guide to referencing](#) - covers a number of styles
- [Plagiarism](#) - preventing, detecting and tracking

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General Tips and Advice

- Collaborative writing guidelines, for when you have to produce a group report
 - [Collaborative writing strategies and resources](#) (from Uni. Texas)
 - [Group work and collaborative writing](#) (from UC Davis)
 - [Guidelines on collaborative Writing](#) (from Uni. North Carolina at Pembroke)
- [Guide for Written Communication](#) is written by Edward G. Wertheim, Associate Prof. in Human Resources Management, Northeastern University, Boston.
- [Guide to Grammar and Style](#) (Jack Lynch)
- [Guide to Grammar and Writing](#) (Charles Darling)
- [How to Write Right](#) is an article aimed at engineers written by G. Blair. This page also contains links to matters related to [Basic Management Skills](#)
- [Writing tips](#) - covering a wide range of issues, from abbreviations, to punctuation, to writing style.