Everything you need to know about writing a thesis

The guidelines in this document are quite general to thesis writing, regardless of with whom you work. They are, however, particularly important if you wish to write a thesis with a subset of the following faculty: Herbert, Cristiano, Erik, Klaus, and Bala.

Length

"Write as little as possible while still providing all the information you need to provide, but not less." — Faculty at VU (who will be reading and evaluating your thesis)

If you are hard pressed for numbers, we provide a few thumb rules below.

- A "traditional" bachelor's thesis would be **20 pages** long, while a master's thesis would be **30-50 pages** long.
  Click to download the template for this thesis format.

- A "paper-style" thesis would be 12-14 pages long, typically in the form of a (double-column, 9-point-font) conference paper.
  *(Note: While writing 12 pages sounds much easier than writing 30 pages, it **is not**. The limited space in this format implies that you must express your work clearly and concisely.)*
  Click to download the template for this thesis format.

Structure

Although the organisation of a thesis would vary depending on the topic (e.g., you may not need a threat model or a limitations section), typically a thesis is organized as follows.

1. **Abstract** (required)
   This first and short section includes a summary of the work. A strong abstract highlights the research problem, which the thesis addresses,

succinctly describes why the problem is worth pursuing, and highlights the contributions of the thesis towards addressing the problem.

2. **Introduction** (required)
   This section includes some motivations behind the work, explicitly or implicitly highlights the ***research question***, provides a high-level explanation of the solution, and describes the contributions.

3. **Background** (optional)
   This section provides the necessary context to help the reader understand the remainder of the thesis.

4. **Threat model** (required for an attack or defense paper)
   Use this section to address key questions: *(a) What does this thesis or paper assume about the attackers' goals and objectives? (b) What do you assume about the systems and their environment, etc.*

5. **Overview** (optional)
   This section provides a high-level outline of the proposed system or solution. It typically illustrates the system architecture or the interactions between the different solution components (via a "boxes-and-arrows" diagram) from a user's perspective.

6. **Design** (required)
   In this section, you would provide a high-level description of the system or solution and explain your design choices.

7. **Implementation** (optional)
   This section presents *important* implementation details.

8. **Evaluation** (required)
   Discuss the design of your experiments, the results you obtained, and how they help in evaluating the claims you made in the introduction. You may also use the evaluation results in this section to justify your design choices or assess the contributions of different aspects of your design towards the overall goals.

9. **Discussion/limitations** (optional)
   A "limitations" section, as the name implies, describes scenarios where the proposed solution may not work well. Although a "discussion"

section could also highlight limitations of the proposed work, it focuses on analyzing the implications of the proposed work for current and future research.

10. **Related work** (required)
    It is quite unlikely that you were the first to address this problem. Please use this section, hence, to discuss what prior work had done and how your solution is different from or better than prior work. You may place this section immediately after the "Background" section, if necessary.

11. **Conclusion** (required)
    Briefly summarize your contributions, and share a glimpse of the implications of this work for future research.

For more details on style and structure for papers, please refer to the "Writing a System Security Paper" document.

Topic

While there are many interesting topics for research, if you would like to work with the faculty mentioned at the beginning of this guide, we expect you to pick a topic that overlaps with our research interests.

For a security-related thesis, please read through the "Threats to Validity and Relevance in Security Research" document.

Internal vs. External Projects

You can do your project either *internally*, with the faculty at VUSec, or *externally*, say at a company.

For internal projects, please feel free to reach out to us; we are always on the lookout for bright students to pursue interesting ideas.

When it comes to external projects, the following guidelines apply.

- We can probably help you get in touch with external organizations, but *you* are responsible for negotiating the project topic with the organization.

- Since the project *must* meet the academic standards and comply with the requirements of VUSec, please make sure that we approve the project *before* you start working on it.
- You will mostly be supervised by researchers or mentors in the organization, where you are doing the project. We, the VU supervisors, will not engage with you on a day-to-day basis; we are, however, available for consultation. We will actively engage with you, once the project is completed, to review and grade your work.

Feedback

For internal projects, we will assign you a daily supervisor. We will also discuss your progress during the weekly meetings, every wednesday at 11:00.

To have your thesis approved, we suggest the following approach.

1. Submit an outline to your supervisor(s) and have it approved.
2. Submit a draft to your daily supervisor and incorporate their feedback. You may have to iterate this process a few times to refine the draft into a good thesis.
3. *Always* spell-check and grammar-check your drafts. Given the overwhelming number of tools to perform these checks, failure to do these checks reflects poorly on you.
    a. Consult a good dictionary; dictionary.com and thefreedictionary.com are not good dictionaries. Use m-w.com or collinsdictionary.com or, if you have an account, oed.com
4. Submit the pre-final draft to the first and second readers (faculty) and incorporate feedback.
5. Submit final version after incorporating feedback from faculty. This final version *will* be graded.
   (You will get feedback on your outline, the initial, and the pre-final drafts. You must not expect the faculty to proofread every section during each consult. You must not expect the faculty to provide more than a reasonable number of consults for soliciting feedback.)

Grade

We determine your grade based on your research work, the quality of your final thesis and presentation.