HELSINGIN YLIOPISTO
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI

PAP301 Seminars in Particle Physics and Astrophysical Sciences

5 ECTS course 2024-2025

https://www.mv.helsinki.fi/home/osterber/Paras_seminars/

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Goals & outcomes of the course

- Develop your **oral & writing skills** in scientific contexts of your own specialisation (”presentation skills”) in English
- Develop your **peer-reviewing skills** (”feedback”)
- Develop your ability to **promote your expertise and market yourself** (”career development”)

- **Plan your MSc thesis** & start writing it (if not already on-going, autumn 2024)
- **Make a MSc thesis disposition** (autumn 2024)
- **Prepare & give oral presentation** related to MSc thesis subject (spring 2025, first oral presentations already in Nov-Dec 2024?)
- **Give feedback** to your fellow students on their oral presentation (spring 2025)
- **Career related lectures & task(s)** (spring 2025)

Course plan

Gatherings:

- ✓ Period I-IV: Wednesday 14-16 in lecture room Chemicum A121
  Get-to-gethers only occassionally, email sent in advance.
  Preliminary dates for autumn: Wed 13.11 and Wed 11.12.
- ✓ Career related lectures/webinars (spring, date & time to be fixed)

Course homepage:

https://www.mv.helsinki.fi/home/osterber/Paras_seminars/

Autumn 2024: focus on starting and planning of MSc thesis

Spring 2025: focus on the preparation & giving of oral presentation (+ giving of feedback) as well as career related lectures & tasks

Course requirements & grading

Course requirements:

- Make MSc thesis supervision agreement (if not yet done, autumn)
- Complete thesis disposition exercise (autumn)
- Make career development related tasks (spring)
- One page abstract of seminar topic (spring)
- Giving of a 25 minute seminar (spring)
- Act as opponent to seminar at least twice (spring)
- Min. 80 % attendance of seminars & career lectures/webinars (spring)

Course assessment (based on seminar, grading 0-5, same as PHYS4006):

- ✓ 25 % timing (providing abstract 1 week in advance & slides 4 h before presentation and keeping the 25 min presentation time)
- ✓ 25 % abstract (title, clarity & readability, language and correspondence to presentation)
- ✓ 25 % presentation material (general impression, basic information, amount of slides, text & bullets and figures, formulas & tables)
- ✓ 25 % presentation itself (look & talk towards audience, audiable voice, suitable pace and answer to questions)

MSc thesis

More details & useful links: ParAs programme moodle page
https://moodle.helsinki.fi/course/view.php?id=45534

Academic trained person should be able to find facts in reference works and to express his/her thoughts in writing logically and clearly. The MSc thesis will train these skills.

Master thesis: 30 ECTS credits
suggested length ~ 40-50 pages (however field & topic dependent)

MSc thesis work phases:

- ✓ familiarization with reference works
- ✓ independent research work
- ✓ making of a disposition for the thesis
- ✓ thesis writing

} Under the guidance of the supervisor

Structure and argumentation

See e.g. https://www.sokogskriv.no/en/writing/

The structure of your text is the “skeleton” that holds the various elements together – in the right order. To ensure that your text is properly structured and flows well, it is important to understand the function of the different chapters. In a thesis, everything you write has a function.

In a good thesis:

- All questions raised by the author are answered or clarified.
- The reader understands where the author is going at all times.
- Everything that is introduced and explained has a function.
- Theory, if used, analyses/interprets data.
- The method chapter is concrete.
- The findings are clearly described.
- The discussion brings together empirical evidence, theory and method.
- The conclusion follows from what had been discussed.

(Typical) structure of MSc thesis

See e.g. https://www.sokogskriv.no/en/writing/

- ✓ Abstract/summary
- ✓ Foreword (optional)
- ✓ Introduction
- ✓ Theory (optional, theory can be included in introduction)
- ✓ Methods
- ✓ Results/analysis
- ✓ Discussion and Conclusion (separate or together)
- ✓ List of references: apply reference convention of physics field
  - + either in alphabetic order with year e.g. [Donald2010] …
    or numbered in the order the references occur e.g. [1] …
- ✓ Possible appendices

Abstract/Summary and Foreword

See e.g. https://www.sokogskriv.no/en/writing/

Most readers will turn first to the abstract (or summary). Use it as an opportunity to raise the reader's interest. **The abstract should highlight the main points from your work, especially the thesis statement, methods (if applicable), findings and conclusion.** However, the abstract does not need to cover every aspect of your work. The main objective is to give the reader a good idea of what the thesis is about.

The abstract should be completed towards the end; when you are able to overview your project as a whole. Nevertheless a good idea to work on a draft continuously. Writing a good abstract can be difficult, since it should only include the most important points of your work. But this is also why working on your abstract can be so useful – it forces you to identify the key elements of your writing project.

There are usually no formal requirements for forewords, but it is common practice to thank your supervisors, colleagues, and others who have helped and supported you. If you have received grants or research support, you should also acknowledge these.

Writing one thing at the time

See e.g. https://www.sokogskriv.no/en/writing/

In order to write effectively, it is important to understand the different functions that your writing needs to perform. For example, you need to distinguish between **presentation, interpretation, analysis and discussion**. Deal with one thing at a time, and avoid mixing for example explanation and discussion. In this way, you will create a more orderly text.

One way of distinguishing between different functions is to put all your introductory material into dedicated chapters (a theory chapter, a chapter to present your findings etc.) and then put everything that can be classified as discussion into a separate discussion chapter. You may also choose to discuss as you go along. Whatever strategy you adopt, **it is important to indicate clearly which parts of your text are descriptive in nature and which parts represent your interpretation, your or other scholars' arguments** etc... This will help the reader to follow your reasoning, and help you to fulfil the research ideals of reflectivity and objectivity.

Writing one thing at the time

See e.g. https://www.sokogskriv.no/en/writing/

Presentation

Descriptions and presentations should be as neutral and straightforward as possible. When presenting a theory, for example, the test is whether the originator of the theory would approve of what you have written. On this basis, your criticism will carry much more weight than if your presentation were skewed from the start. Your text will be better organised if you begin a new section before starting a discussion – but this is a matter of style and no absolute rule. **Tip!** Present the material with your own words, then consult the source to check the facts.

Analysis

Data collected for an empirical dissertation will have to be analysed, i.e. interpreted, coded and/or categorised. There are many ways of doing this and you should refer to methodological literature in your field. The analysis can either be integrated or follow your presentations. For examples other theses are probably the best sources.

Discussion

In a dissertation, argumentation and discussion are central. You can either discuss your ideas and concepts as you go along or in a separate chapter. Whichever strategy you adopt, make sure that you are not presenting and discussing at the same time.

Introduction

See e.g. https://www.sokogskriv.no/en/writing/

Your introduction has two main purposes: 1) to give an overview of the main points of your thesis, and 2) raise the reader's interest. It is recommended to rewrite the introduction one last time when the writing is done, to ensure that it connects well with your conclusion.

Tip: For a nice, stylistic twist you can reuse a theme from the introduction in your conclusion. For example, you might present a particular scenario *one* way in your introduction, and then return to it in your conclusion from a different – richer or contrasting – perspective.

The introduction should include:

- The background for your choice of theme
- A discussion of your research question or thesis statement
- A schematic outline of the remainder of your thesis

Defining the scope of the thesis

See e.g. https://www.sokogskriv.no/en/writing/

One of the first tasks of a researcher is defining the scope of a study, i.e., its area (theme, field) and the amount of information to be included. Narrowing the scope of your thesis can be time-consuming. Paradoxically, the more you limit the scope, the more interesting it becomes.

The research question can be formulated as one main question with (a few) more specific sub-questions or in the form of a hypothesis that will be tested. Your research question will be your guide as your writing proceeds. You are also free to modify it as you go along.

How do you know that you have drafted a research question?
Most importantly, a research question is something that *can be answered*.

Some tips:

- Use interrogative words: how, why, which (factors/situations) etc.
- Try to condense your research question into one general question – and perhaps a few more specific sub-questions (2-3 will usually suffice).

Theory/Model

See e.g. https://www.sokogskriv.no/en/writing/

Theory (model) in an empirical study is meant to shed light on the data in a scientific manner. It should give insights not achievable by ordinary, everyday reflections. The main purpose to use theory is to analyse and interpret your data. Therefore, you should *not* present theory that are not being put to use.

Not all theses have a separate theory section. The theory can be included in the introduction, and the second chapter covers the methods used.

What kind of theory should you choose? Since the theory is the foundation for your data analysis it can be useful to select a theory that lets you distinguish between, and categorise different phenomena. Other theories let you develop the various nuances of a phenomenon. In other words, you have a choice of either reducing the complexity of your data or expanding upon something that initially looks simple.

How much time and space should you devote to the theory chapter? The nature of your research should decide: Some studies do not require much theory, but put more emphasis on the method, while other studies need a rich theory section to enable an interesting discussion.

Methods

See e.g. https://www.sokogskriv.no/en/writing/

Method

Use your method chapter to show that you arrived at your results by applying valid and reliable methods. Explain what you did; your research, treatment or professional intervention, and how you did it.

- Account for …
- Document …
- … what you did and did *not* do

What you **must** do is to show how your choice of research method is suited to answering your research question(s). Demonstrate that you have given due consideration to the validity and reliability of your chosen method. By "showing" instead of "telling", you demonstrate that you have understood the practical meaning of these concepts.

Your method chapter shows how you arrived at your results !

Results/analysis

See e.g. https://www.sokogskriv.no/en/writing/

Results

A relatively large part of your thesis should be devoted to your results/ analysis (findings, data, empirical evidence). In this section you should:

- Present the findings
  Organise, classify, analyse and (if relevant) categorise
- Explain and interpret (e.g. differences between various studies)
- Assess and evaluate

Your results = the essence of your thesis. The Introduction and Methods chapter should build up to your results by showing how you arrived at your results (Methods) and their significance (Introduction).

Discussion

See e.g. https://www.sokogskriv.no/en/writing/

In many thesis, the discussion is the most important part. Make sure that you allocate enough time and space for a good discussion. This is your opportunity to show that you have understood the significance of your findings and that you are capable of applying theory in an independent manner.

The discussion will consist of argumentation. In other words, you investigate a phenomenon from several different perspectives. To discuss means to question your findings, and to consider different interpretations. Here are a few examples of formulations that signal argumentation:

- On the one hand … and on the other …
- However …
- … it could also be argued that …
- … another possible explanation may be …

Conclusion

See e.g. https://www.sokogskriv.no/en/writing/

The final section of your thesis may take one of several different forms. Some theses need a conclusion, while for others a summing up will be appropriate. The decisive factor will be the nature of your thesis statement and/or research question. Open research questions cannot always be answered, but if a definite answer is possible, you *must* provide a conclusion. The conclusion should answer your research question(s). Remember that a negative conclusion is also valid.

A summing up should repeat the most important issues raised in your thesis (particularly in the discussion), although preferably stated in a (slightly) different way. For example, you could frame the issues within a wider context.

Placing your thesis in perspective

See e.g. https://www.sokogskriv.no/en/writing/

In the final section you should place your work in a wider, academic perspective and determine any unresolved questions. During the work, you may have encountered new research questions and interesting literature which could have been followed up. At this point, you may point out these possible developments, while making it clear for the reader that they were beyond the framework of your current project.

- Briefly discuss your results through a different perspective. This will allow you to see aspects that were not apparent to you at the project preparation stage
- Highlight alternative research questions that you have found in the source materials used in the project
- Show how others have placed the subject area in a wider context
- If others have drawn different conclusions from yours, this will provide you with ideas of new ways to view the research question
- Describe any unanswered aspects of your project
- Specify potential follow up and new projects

A good thesis should "bite itself in the tail"

MSc thesis disposition task

1. **Write your research question and open it up in detail** (Toulmin's model)

- What is your (preliminary) **conclusion/claim to your research question?**
- Which is **your argumentation** for your (preliminary) conclusion/claim and how are you going **show (proceed to) it ?**
- What kind of **research methods** are you going using?
- Which **counterarguments** do you have against your methods/conclusion/claim?
- From where can you find **backing/support** to use this methods?
- **To which degree** is your (preliminary) conclusion/claim to your research question **certain, probable or possible**? How will **you qualify it**?

2. Make **outline and/or chapter composition** of your MSc thesis

3. Write a **short description of the content of each chapter** (as well as possible according to your current knowledge)

Deadline: Monday 11.11.2024 23:55, return on Moodle only:
https://moodle.helsinki.fi/course/view.php?id=28327