Lab reports – Advanced Lab Course, Master in Physics

- **Title page**
  - Name of the experiment
  - Names of the student(s)
  - Abstract, summarize the topic and the most important findings (3-6 sentences)

- **Introduction, motivation, topic**
  - Introduce the background of the experiment (why is it interesting, how do researchers use a particular experimental techniques, how can the topic/technique be applied in a more general schemes)
  - brief presentation of the underlying physical principles
  - state the objective/goal of your experiment

- **Methods**
  - Sketch (figure) of the experimental setup, focused on important parts. Indicate which data will be measured by which part(s) of the setup
  - discussion of the figure, introduction of important parameters
  - if applicable: introduce specific tools or approaches for the measurements
  - equations you will need during data anylsis. Motivate them briefly
  - introduce the names and meaning of all variables you will use during data analysis

- **Data (if applicable)**
  - tables with parameters and measured values. Might better go into an appendix unless it is very short.
  - Include errors of measurements, indicate if and how often experiments were repeated, the table needs to contain units of measurements, error ranges
  - add notes you took during the measurements

- **Results**
  - Analyse the measured data. Report data with significant digits only.
  - Perform a statistical analysis in case of multiple/repeated readings
  - Present data in graphs, pay attention to meaningful scales. The graphs need to be prepared for the lab report. It is not ok to copy and paste fotos.
  - clearly label and mark your graphs
  - describe each graph with a short discussion in the text
  - describe errors in your experiments, uncertainties in your results, use statistical error analysis and error propagation.
  - clearly state your finding/final result

- **Discussion**
  - Discuss you finding/final result, compare your results to your initial expectations
  - are there any obvious improvements you would suggest
  - clearly answer specific questions given in the instructions
  - discuss the physical insight you gained from the experiment, discuss your understanding of the specific experimental technique you learnt about
  - do you have ideas for future work

- **Conclusion**
  - Briefly summarize the topic of your experiments, your results, and the insight you gained.
  - In a separate statement briefly explain the contribution of each group member to the experiment and the lab report.