# PH30036 Final-Year Project
# Guidance about the Final Report 2021-22

Note that this information is similar but not identical to that given for the unit PH40065 taken by MSci students. There are important differences, so make sure you use the right version!

## Submission timetable

**Week commencing Monday 25 April:** If your supervisor has agreed to read your report, you should give your full draft to them this week and arrange to get feedback. NB you may not get feedback, and any you do get is indicative only - following your supervisor's advice does not guarantee you a good mark!

**12:00 noon, TUESDAY 10 MAY 2022:** This is the deadline to submit your report via the unit's Moodle page. **THIS IS A VERY STRICT DEADLINE.** If you miss it, you risk losing a very large number of marks toward your degree. To reduce risk, aim for the previous day - you won't get an extension just because your home broadband or ISP is down on deadline day.

## Report format

**Report length:** 20 pages maximum, including the abstract, acknowledgements and references. Use 12 point font (Times New Roman or similar), single column, single line spacing, and black ink for the text. Include a margin of at least 25 mm on all sides. Number the pages.

You are welcome to use Latex to prepare your report if you wish, with a font equivalent in size to 12 point Times New Roman. However, I know nothing about Latex and I can't help you if you have problems. You can always use Word instead.

Exceptionally, some students may want to add appendices. This should not be necessary for most. Appendices are not counted within the 20 page limit, and the staff assessing your report may not read them!

Start with a title and your name - this assessment is not anonymous.

## Electronic submission

You must submit your report as a PDF file via the link on the PH30036/PH40065 Moodle page. A link will be provided nearer to the deadline. It will be used for assessment, and we will also submit it for plagiarism checking (see your course handbook for further details). The file must be a PDF: if you use another format and we can't read it, there will be unnecessary complications for us and for you! You are responsible for checking that your PDF is readable on University computers and looks right when printed on a University printer (eg all the fonts/equations/figures/etc render as intended).

Name the file with the pattern LastnameFirstnameReport.pdf - a submission by me would be BirksTimReport.pdf.

## What the report is worth

45% of your project marks are given for the report by supervisor and assessor. It will also be the basis for the discussions in your viva, worth another 22.5%. And of course it will be a memento of your degree course, to be treasured forever.

## How to write your report

Projects are assessed for each student individually. It is usual for project partners to share results, but you must each submit your own independently-prepared report. Even if the data in your figures are the same, we don't expect the figures themselves to be identical; the same photograph may appear in both reports, but the caption should be your own text. Be clear about what your individual contribution to the project was: if your partner was primarily responsible for something, you must acknowledge it.

Your report is a key way for assessors to judge your project, so write it as carefully as possible. They will look for logical and focused structure, clear and concise explanations, excellent quality of presentation and a good writing style. You can get good marks for a project even if you didn't meet all its objectives!

Don't underestimate the effort required. Writing a good report takes time, and requires concentration and stamina. Organise your time efficiently, and allow for things to go wrong. It can be useful to look critically through previous students' reports: what works, and what doesn't. Evaluate your own work critically: you'll need to re-edit it several times before it's ready, and allow for this in planning your time. As well as the draft you'll submit to your supervisor, consider asking friends or family for constructive criticism.

**Focus on your intended audience:** Write to be understood by a reader with a good general knowledge of physics - say a final-year physics student - but who is not familiar with the specialist field of your particular project. Read your draft to check this is the case. Avoid explaining in detail material in 1st and 2nd year units, but give enough detail on the theory, equipment and techniques used in your project for a non-specialist to follow. Try to avoid jargon - explain the meanings of any specialist terms or abbreviations.

**Tell your story in a clear and logical way:** Your report should be structured in a coherent and logical way, such that the over-riding "story" you are telling is clear. Make clear from the start what the aims and objectves are, to help the reader appreciate how what you did was directed towards achieving them.

**Plan the structure of your report:** Before starting to write, make sure you are clear on the overall aim of your project. Sketch a draft structure, laying out the various sections in order, and writing a brief summary under each heading of what you plan to include. This skeleton outline should help you check you are organising your material in a coherent way. You can then decide how long each section should be, to fit the page limit and give a balanced and well-structured report.

**Think about the order in which you write the sections:** Having constructed an outline, fill in the sections. However, you don't have to write the sections in the order they appear, starting at the beginning and working your way through. It's often better to write the results section first, plotting the graphs etc you plan to include, then writing the methods and discussion sections around them. You'll then see what relevant background material you need in the introduction, in the light of the results presented. The conclusions and abstract can be written last of all, as they give an overview of what you've already written.

**Be meticulous about presentation, spelling and grammar:** Use a spelling/grammar checker, but it's no substitute for care in proof-reading. Make references accurate and complete, number all equations (even if you don't refer to them, someone else may), label axes on graphs, and include units wherever relevant. Common errors include not treating value and unit as separate words (write "25 mm" not "25mm"), and using a capital letter in a word like "Where" after an equation (if the word is in the same sentence as the equation). Identify figures with a number, and put a caption directly below. Refer to them in the text by their figure number (not by location/proximity), and insert them close to where they are first mentioned.

You should write in the past tense - this is an account of things done. Students are also often advised to use the agent-free passive voice ("It was found..." rather than "We found...") common in scientific writing, as it is a formal, impersonal style that focuses on what was done rather than who did it. Personally I find passive voice to be stilted and dull, but it does help avoid writing that is too colloquial and chatty.

**Level:** Pitch your report to be comprehensible to a typical BSc student who has taken the same units as you, but who knows nothing about your project. Don't pitch it to your supervisor's level of expertise!

**Proof reading:** It can be useful to show a draft of your report to your supervisor if they are willing, allowing time for them to read it and for you to act on their points. The more complete the draft, the more useful the feedback. Supervisors may comment on only one draft from each of you, so don't ask for more. They will not proof-read line by line, but concentrate on broad issues like structure, balance between sections, scientific accuracy and writing style.

## Report structure

The report should be laid out like your lab reports in years 1 and 2. Divide it into sections (and subsections), structuring your material appropriately within them. Typical section headings are given below, but don't regard them as completely fixed: projects vary, so adapt the advice to best present your work. If in doubt, consult your supervisor.

**Abstract:** Your report must have an abstract of 100-200 words. It should provide a brief summary of the aims of the project and what you achieved.

**Introduction:** This surveys the background to your project, explaining the topic being investigated, discussing previous work and laying out relevant background theory and methods. Include a literature review of relevant publications. Be selective: the number of possible references depends on the project but may be enormous. Assessors will look for the ability to critically evaluate the literature and identify key papers. A clear introduction, explaining the context of the work to a non-specialist, can make all the difference between an incomprehensible report and one that's a pleasure to read. Don't assume too much prior knowledge.

**Experimental/computational methods:** Describe your equipment, samples, techniques and/or computational methods clearly, so an interested reader could repeat your work if they chose to. Explain why you chose these particular methods. You can include the methods used to process your raw data, or you may prefer to include this in your results section.

**Results:** Present all important results as clearly as possible in tabular or graphical form (but almost certainly not both), with linking text to briefly describe your figures. Include enough detail for the reader to understand what is plotted. Point out trends or features in your data, and discuss the errors. However, leave in-depth analysis of your results for the discussion section. If you generated many similar sets of raw data, don't include all of them here. (If necessary they can go in an appendix, referenced from here.) Think carefully how to process your data, and how to present it to tell your "story" as clearly and succinctly as possible.

**Discussion:** This brings together the preceding material. You should think hard about its content. Discuss the results from the previous section while avoiding simple repetition, analysing and interpreting them in the light of theory, and assessing the significance of your findings in the context of work done elsewhere. This is one of the key sections that the assessors will focus on to judge your understanding.

**Conclusions:** This summarises your main findings, suggests areas for further work or improvement, and draws conclusions from the whole report. You should use this section to critique your work, examine what has been achieved and put this in context.

**Acknowledgements:** Acknowledge help you received from others, outlining the nature of the assistance. Say wherever someone else was responsible for producing data you use, eg for performing a calculation. As well as being courteous, it allows the reader to identify your particular contribution to the project.

**References:** List the sources you used. Proper referencing is essential to enable the reader to read your sources and clarify or expand on what you have said. It also attributes credit for work done by others. Your assessors will not be impressed by reliance on web-based sources, but are looking for use of the refereed scientific literature. Information about referencing methods may be found on the library website at https://library.bath.ac.uk/referencing.

Failure to properly reference your source material is plagiarism, and will be dealt with as such. Further information on plagiarism can be found at https://library.bath.ac.uk/referencing/plagiarism. If in any doubt as to whether you are referencing correctly, consult your supervisor.

**Appendices (optional):** Appendices are for raw data, computer code, questionnaires, lengthy derivations etc which are not appropriate in the main body of the report, but which you feel may be useful as supplementary material or for anyone continuing your work in future. However, staff assessing your report may not read the appendices, so material that is essential to understand your project work should be placed in the main body of the report instead.

## Assessment

The PH30036 final year project is a 12 credit unit and is assessed as follows:

**1. Oral presentation:** Held near the project mid-point, this is assessed on your level of understanding, the quality of the work to date, your planning of the remaining work and the quality of the presentation. It is marked by the assessor and is worth 10% of the unit mark.

**2. End-of-project assessment.**

*(a) Performance during the project:* Your supervisor gives a mark for your performance during the project, based on factors such as motivation, initiative, creativity, time and project management, problem-solving and technical skills, and achievement. This is worth 22.5% of the unit mark.

*(b) Written report:* Both supervisor and assessor independently award a mark for your report. They mark without seeing each other's marks. Each person's mark is worth 22.5% of the unit mark.

*(c) Viva voce examination:* This 30 minute oral discussion is attended by each student individually, with their assessor and chair. The chair is present at a number of vivas, to carry out a moderating role. The assessor gives a mark based on the level of understanding of your project. This is worth 22.5% of the unit mark.

## Guidelines for your viva

Vivas take place at the end of the semester 2 assessment period (you'll receive a detailed timetable nearer the time). In the viva, the chair and (mostly) the assessor will ask you questions about your project work, giving you the opportunity to discuss what you did and why. It is not like a written exam - you are not awarded marks for correct answers to prepared questions. It is a discussion between you and the examiners, aimed at:

- checking that the report is your own work;
- finding out how well you understand the material in your report; and
- finding out if your knowledge and understanding goes beyond what is in the report.

The first point is usually straightforward but, to avoid doubts, make sure you read your report carefully and know what's in it. It's very bad when a student seems completely unaware of the content of their report! Otherwise, it's hard to predict what questions to expect because projects are different and the discussion follows its own course, depending on the answers given. However, here are a few things to prepare for:

- Vivas often start with the student giving a brief (a couple of minutes) summary of the project.
- Be ready to talk about the aims of the project and how they fit the wider context of research in the field. The examiners will probe your knowledge and understanding of this background material.
- Be ready to discuss the basic physics (things covered in earlier years) behind your project. For example, if your project was holography, you might be asked about interference and diffraction.
- Be ready to discuss the methodology you used in the course of the project. This is more likely to cover the reasons for choosing a particular method than questions of fact about what you did.
- Discussion often centres on figures. It's easy to ask: What are you plotting? Why are you plotting these things? What do the different curves mean? What do I learn from the figure?
- Similarly with equations: What do the symbols represent? Why do you expect these quantities to be related in this way? What assumptions have gone into the equation, and are they valid?
- Be ready to discuss what you've learned from your results, the limitations of what you've done, and how the project might be extended.

It's useful to have a copy of your report to hand during the viva (annotated, if you like), but don't bring a large quantity of notes, papers, etc. The examiners want to find out what you know; they don't want to watch you scrabbling through a pile of papers looking for an answer.

Finally, there is no dress code. It isn't a job interview. Just be comfortable - most students turn up in their normal clothes.