| epcc |

Title of the MSc Project

Feasibility Study

EPCC Dissertations Team

Date

Preliminaries

*This section is **not** a part of the Feasibility Study.*

This is a template for your Feasibility Study. You are free to reuse it, or to create your own document covering similar topics. The template contains explanations of what is expected in each section, and you can simply replace the explanatory text with information related to your project.

Sections 1 to 4 cover the technical details of your project: after having read your report, the reader should understand how your work fits in the wider field, what has been done so far and what outstanding challenges there are, and what is the precise topic and expected outcome of your work.

Sections 5 to 8 cover the project management topics, content of these sections should be formulated to match the contents of Section 4 (the project proposal) closely. This part of the report should convince the reader that you have a realistic plan to deliver the project as proposed in Section 4.

1 Introduction

This should contain a description of your project and the problem you are trying to solve. Where appropriate, you should also include references to work which has already been done on your topic and anything else which lets you set your work in context. This should be only few sentences long.

One of the things you will need to do is to ensure that you have a suitable list of references. To do this you should see [1] or some other suitable reference. Note that despite the format of the citation used here is the style favoured in this department, you don't have to adhere to it. Here is another reference [2] for good measure.

You will also want to make sure you have no spelling or grammatical mistakes. To help idwentify spelling mistukes you caan use the commands *ispell* or *spell*. See the appropriate manual pages. Remember that spelling mistakes are not the only errors which can occur. Spelling checkers will not find errors which are, in fact, valid words such as *there* for *their*, nor will they find repeated words which sometimes occur if your concentration is broken when typing. **There is no substitute for thorough proof reading!**

2 Background and Literature Review

Provide overview of literature relevant to your topic. At this point, "breadth" of the discussion is more important than its "depth"; in other words, more sources described on high level to provide context and the "big picture" is more valuable than studying few sources in a great depth. You should also introduce methods or techniques you have investigated and plan to use.

3 Preliminary Investigations and Findings

Any hands-on stuff/results go here. Remember that the Feasibility Study should result in a proof-of-concept implementation or work very close to that.

4 Project Proposal

State in few sentences what problem you are going to address in your dissertation project. Ideally, this would be formulated as a hypothesis/hypotheses to test.

4.1 Success Criteria

Reflect on

- What will define the success of the project.

- What are your fall-backs? What is the "minimum viable product"?

- What could you do if you achieve the goals early, what are possible extensions?

You will have to refer back to these in your dissertation!

5 Workplan

Consider the steps you need to take to deliver the project goals, think of main milestones and checkpoints. Remember that apart from the technical results, you will need to prepare the dissertation report and presentation, and that the repository is a submitted and assessed part of your work as well.

Try to be realistic — start from an optimal timetable you expect to be able to work on, but add some buffering or extra times for unexpected delays. The "ideal" student is a mythical creature that no supervisor expects to supervise, so do not create your plan for the ideal student, try to honestly assess your own situation, including your other commitments. This will give you much better chances to meet your goals.

You might want to plan your work so that there are different tasks you can be working on at any given period, it is quite unlikely that you would be able to work on the same task for a long period of time effectively and having an alternative task to switch to might result in less time being wasted (imagine spending long periods of time on developing code, writing the dissertation report, or refactoring and commenting your code). However, be mindful of the time overhead related to context switching. Take this opportunity to experiment with organising your work and checking that you are still on track for delivery — time and work management is one of the skills that are assessed and marked by your supervisor.

There are no strict requirements or expectations for the workplan in terms of form or level of detail. However, it should contain a meaningful set of milestones and these should be specific enough so that you can clearly understand when they are met. Try to estimate the amount of effort to deliver each milestone and check against the calendar time that you would be on time to deliver even if you encounter minor delays. Checking against the plan while working on your dissertation allows to you identify complications early on and take corrective actions in time. If your workplan is mostly linear, you can simply provide a list of milestones, the required effort and expected delivery date for them, but if there are overlapping tasks you might want to consider visualizing this e.g. as a Gantt chart (note that you can create a simple visualisation in a spreadsheet or a table, you do not need to look for a bespoke software).

6   Resources Estimation

Estimating resources before the work starts is known to be hard, but you should record here your best guess and monitor your use of resources during the course of the project. You should also consider what impact overrunnig your budget would have on your work. It is common for large projects to overrun by up to 50% of the estimated resources, so consider sufficient buffering in your proposal and workplan, and you may even include it in the risks.

It is well worth investing part of your Project Preparation time in creating a proof of concept, a small demo, or even just a "Hello World" kind of work using the tools you plan to use in the dissertation, this may help you get a sound idea of how much you can achieve using particular resources, and hence to estimate how much resources the full task requires. You can also consider trade-offs, it may be that you can use cheaper or more accessible resource such as your computer instead of an HPC cluster, but could you afford the additional time this would require?

If applicable to your project, try to estimate resources needed for your work:

- Estimate CPU/GPU hours needed

- Estimate storage needed

- Additional costs inferred?

- Access to data

- *Anything else* – E.g. does your project need ethical approval or NDA, and what stage are you at with getting relevant approvals?

If you require access to any hardware resources or infrastructure run by EPCC or UoE, discuss this with your supervisor and email dissertation@epcc.ed.ac.uk with a request. We will get back to you ASAP to discuss what can be done and how, but remember that even though many hardware resources are in principle available, the access to them won't be instant.

7   Risk Analysis

Consider the success criteria, main milestones and the minimum viable product, as well as resource requirements outlined earlier. What are bare necessities for you to carry out the work? Which of these resources and inputs might fail or become unavailable, and what would you do in such a situation? What if the work does not progress as planned?

Remember that Risk management is not a one-off activity, but an ongoing process. The two main tasks are *risk assessment* (i.e., identification, analysis and prioritisation of risks) and *risk control* (i.e., management planning, monitoring and resolution). This section should cover the whole risk assessment as well as risk management planning, but even these topics should be routinely revisited during the dissertation work, as new risks might appear or some risks might become deprecated.

You should capture the risks in a list or a table. Each risk should have a brief description that allows you to understand whether your situation meets a risk's definition, and whether the correcting action should be triggered. You should consider the probability and impact of each risk, and depending on how these two parameters combine you should provide an appropriate correction.

You can use a *quantitative* approach: assign probability of risk happening as a percentage (0% being impossible and 100% being certain), consider the delay the risk would cause (eg in

days, or as a percentage from project's time) and multiply the two to derive "risk units". A *qualitative* approach would assign each risk one of the probability categories — unlikely, possible, probable or certain — and one of the impact categories — negligible, moderate, severe and catastrophic. You can then group risks based on their importance using the matrix in Fig. 1.

The corrective action typically is either avoiding/preventing the risk, e.g. by eliminating the causes of the risk, or my having a mitigating action in mind. For example, one can avoid risks related to access to a particular dataset by choosing to work with an alternative dataset which is guaranteed to persist and be available, or, if this is not possible due to the project definition, a mitigating action would be assessing the statistical properties of the dataset in sufficient detail to be able to generate a synthetic dataset of comparable properties to work on in periods when the desired dataset is not available. You should also consider the impact the correcting action may have on the rest of the plan.
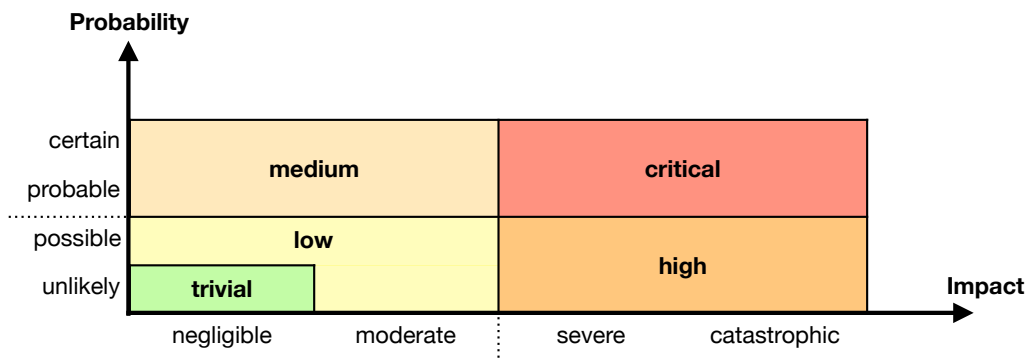

Figure 1: The matrix to assess importance of risks based on qualitative assessment of their probability and impact. The certain or probable risks with severe or catastrophic impact are considered *critical*, while unlikely negligible risks are *trivial*. Other combinations of probability and impact define *low*, *medium* and *high* risk categories.

Most obvious risks relate to technical work (delivering the planned or expected outputs) and are caused by technical difficulties, bugs, tools not working as expected etc., but there are also risks related to budgeting (insufficient or unavailable resources, unexpected situations impacting work) or the project itself (such as unexpected results or change of scope).

8 Outline of the Dissertation Report (Optional)

Towards the end of the Project Preparation phase, you should have a good idea of what "story" you want your dissertation to tell. You should have a good understanding of what partial tasks you need to solve and what techniques to use, so you should be in a good position to plan your dissertation. You may want to outline the chapters and possibly the sections within, or provide few bullet points covering the content you expect in each chapter.

The proposal and the workplan typically provide a good guidance on how to structure the dissertation report. That being said, it is worth considering whether chronological order is the most suitable one for your dissertation; it might turn out that approaching the topic from a different perspective helps highlight some interesting insights or connections that became

apparent during your work. Therefore, the outline you provide here is not binding in any way, your dissertation does not have to be structured exactly as stated here. However, taking the time to think about the dissertation report now reduces the chances that you discover a gap of some sort when writing up towards the end of the dissertation.

While this is a worth-while exercise to go through to ensure that your planned work will cover all aspects that need to be discussed, you do not have to include the outline in your Feasibility Study. Ask yourself whether there is anything "non-standard" about your expected outline and use the opportunity to gather opinions of your markers by providing a preview of your dissertation plans. If you think that your approach is quite standard or that there is nothing worth discussing, you can omit this section.

The dissertation should introduce the field and the problem you are working on; it should clearly explain what and how you have achieved and conclusions you can draw based on your work, and it should also reflect on the expectations stated in this report — you should look back at your workplan, risks, resource estimation and, mostly importantly, your proposal, and you should comment on how closely your dissertation experience corresponded to your expectations, and what lessons you have learned.

Remember that there is no correlation between this and your dissertation mark; it is not a problem if you missed some significant risk that materialised and change the direction or focus of your project completely, as long as you will have noticed, managed to deal with the situation and identified steps that might help you avoid similar issues in the future. Keep in mind that "cherry-picking" and presenting only those results that fit the narrative you have in mind and trying to hide anything that suggests or hints at any possible discrepancy in your results or method is a very bad academic practice that borders on misconduct. Reporting unexpected results and trying to find an explanation for them is often more exciting than the originally foreseen project would be.

For the sake of completeness of the template, here is an example of a numbered list in LATEX:

1. This is top level rhubarb.

    1.1. 2nd level

    1.2. some rhubarb

    1.3. and more

2. More top level rhubarb

    2.1. other boring vegetables

    2.2. kale, for example

3. And so on

References

[1] L.Lamport. *1986 Latex User's Guide and Reference Manual.* Addison Wesley. pp242.

[2] F.Bloggs. *1993 Latex Users do it in Environments* Int. Journal of Silly Findings. pp 23-29.