1 MSC PROJECT GUIDANCE

John H. Williamson, June 2025

1.1 Project

- Please remember that this is *your* project and I can only give advice.
- You must lead, plan and organise all of the work. I cannot do this for you.
- Come prepared with questions when we meet and discuss.
- Please be aware that your professional conduct is being formally assessed during this project.
    - Your preparation, planning, independent leadership, and interaction in meetings is part of this assessment!
- Failure to meet these standards will affect your grade.

1.2 Meetings

1.2.1 Duration

- Meetings will be 30 minute one-on-one meetings conducted in person.

1.2.2 Attendance

- Please let me know if you are unable to make a meeting so we can rearrange. Meetings are usually scheduled back-to-back, so if you are late meeting time will be truncated.
- There will be occasions where I am unavailable for meetings. I will let you know in advance when these are going to happen so you can plan work for those periods.
- Do not miss more than two meetings in a row.
- If you have nothing to report, please still come to the meeting.
- Meetings will be held in person, in my office, S153 Lilybank Gardens video guide to find my office.
- Online meetings will not be used for MSc supervision.
- There are no additional meetings.

- While you are free to email or message me on Teams, I will only have time during our meetings. Do not expect responses outside of meeting times.

1.2.3 Preparation and presentations

- Please submit a short written summary of what you have done in the previous week and email it to me 24 hours in advance of every meeting.
  - This should be four or five bullet points.
- You should take written minutes of each meeting. You should not be in the position of having to have information repeated to you that was discussed in a prior meeting!
- I am always happy for you to record meetings, and I strongly recommend that you do so (e.g. on your phone).
- At the start of each meeting, you will be asked to make a short presentation, with slides. There should be at least the four slides below; you can add more if you have something else you want to show, like results.
  - What you did last week.
  - What questions you have.
  - What your plan is for next week.
  - Where you are in the overall schedule.
- Note: if you don't have a presentation, we won't have a meeting.
- At the start of the project, make a slide with a week-by-week plan (for slide 4) and update it each week.

1.3 Organisation

- Make a weekly plan at the start of the project. You don't have to stick to it, but you do have to update it to reflect reality.
- You only have 12 weeks, so you must use the time carefully.
- Keep your project files organised carefully. You might choose a folder structure like:

```
    meeting_notes/  # keep meeting notes, e.g. in Markdown or plain text,
here.

        20_jun_2024.md
        27_jun_2024.md
        ...

    presentations/  # the presentations for each week

        20_jun_2024.pptx
        27_jun_2024.pptx
```

```
data/           # datasets for your project

dissertation/   # dissertation document, images etc.
    dissertation.tex
    imgs/

src/            # source code for the project, *UNDER VERSION CONTROL*
    ...
```

- However, the details are entirely up to you — it's just important that you have an organised system.

1.4 Dissertation

- Download the dissertation template now and fill in your details.
- Start using a reference manager now. Keep all notes on documents (e.g. academic papers) you read in the reference manager.
    - If you are unfamiliar with reference managers, Zotero is one usable option. There are others.
- Read the Hall of Fame MSc projects carefully at the start of the project. This should be done in the first week of the project
- The earlier you provide drafts of writing the better feedback I can give.
- I will not be able to provide any feedback in the last week of the projects. Submit drafts early.
    - It is preferable to send drafts of small chunks (e.g. chapters) rather than an entire dissertation.

1.5 Code

- All code must be under version control at all times.
    - Note that your use of appropriate tools is part of your assessed professional conduct!
- Use `git` unless you have a strong preference or good reason not to.
- `GitHub` offers free private repositories, as do other providers. Keep local backups as well (e.g. on CSCE storage).
    - You can also use the student GitLab server in the School: https://stgit.dcs.gla.ac.uk
- Please add me as a contributor (read-only is fine) if you can.
- Use whatever IDE/etc. you like. If you don't have an opinion, I recommend VSCode.
- Make sure you understand the University generative AI policy if you use tools like ChatGPT, CoPilot, etc.
    - Please note that this policy *does not* prohibit using these tools, and I would thoroughly recommend using them to assist you, but you may not pass them off as your own work.
- Be ready to demo what you have implemented. If possible, make sure that I could (e.g. in a meeting):

    - clone your repository
    - build the software
    - and run what you've got

1.6 Data

- If you run simulations to generate data, automate them.
    - Write robust, repeatable scripts that generate the results.
    - Store configuration parameters in files.
    - If doing development work with Jupyter notebooks or similar:
        - You can use tools like papermill (to make parameterisable notebooks) or sacred and omniboard (to adjust parameters and store results). There are many other tools.
    - Any result (graph, number) that appears in your dissertation should be reproducible from your code.
- Use appropriate tools to track experiments. For example, if you are doing a machine learning project, you may want to use an experiment tracker like *weights and biases* (wandb.ai) to make sure your results are organised.
- If you will work with human subjects in any experimental work, check the ethics checklist at the start of the project to make sure it will cover you.
- Never modify captured experimental data.
    - Experimental data is immutable. Write reproducible scripts to process data into massaged forms for analysis.

1.7 Getting started

- Choose and agree a topic.
- Collect relevant research papers and read them.
    - Track all your reading in a reference manager.
- Go to the MSc CS+ Moodle project page and read all of the Hall of Fame projects. Understand clearly what you are expected to produce.
- Set up a development environment (install libraries, setup version control)
- Your project will likely be uncertain at this stage. Draw a mind-map of possible directions that project could go in.
- Make a written, week-by-week plan for the whole project. Remember, this doesn't bind you, you can alter it later.
- Consider the key questions:
    - How will I get data for this problem? What does the data look like? How much do I need?
    - How will I implement a solution? What techniques do people apply? What libraries, tools and technologies will I need?
    - How will I know if the solution is successful? How will I evaluate success? What metrics should I apply?
    - How will I explain this work to someone else? What is the purpose? What is the scope?

1.8 Deep learning-specific

- If you are doing a deep learning project, use *PyTorch* unless you have good reasons to use something else.
- Remember that *data* is critical. You must find or acquire suitable data, in great enough quantities, and in the right format.
    - Most projects are held up by minor data processing bugs (e.g. incorrect normalisation). Check, double-check and check again that the data you feed in is correct. *If something doesn't work, assume it is a data problem until proven otherwise.*
- Read this article before undertaking any training of a deep network.
- Track your results systematically. Unless you have a good reason to use something else, use weightsandbiases
- A good starting point for most simple deep learning models are Sebastian Rashcka's: https://github.com/rasbt/deeplearning-models