Formal Requirements and Procedure
How to write a thesis in the PRG

> The following information applies exclusively to students writing their thesis in the PRG. Other groups may have different rules and procedures.

Confirmation

Once you have decided to write your BSc thesis in our group, get the confirmation from the director of studies that you are allowed to start the BSc project. To do this, you need to send a request to the office manager (Bettina Choffat) of the director of studies and ask for the "green form".

For a MSc thesis, follow the *JMCS process.*

Research Proposal

The first thing you are expected to do is to prepare a research proposal. A research proposal serves as a blueprint for your research project. Keep the proposal clear, concise, and well-structured (typically 2–3 pages). It should clearly define the research question, objectives, and methodology while demonstrating the project's feasibility. Additionally, the proposal serves to clarify whether you and the supervisor have the same understanding of the project and thus helps to recognize misunderstandings at an early stage.

Below are the key elements your proposal should contain:

- **Meta-information**: Start with a working title of the project (can be adapted later), give your personal information (name, eMail, matriculation-number), and add the current month and year.
- **Embedding and Motivation**: Briefly introduce the topic and its relevance. If necessary, you can show what the current state of research is and then explain why the problem is important and worth researching.
- **Problem Statement and Objectives**: Clearly define the specific research problem and open questions. State the main objectives of the project. Typically, we expect 2-3 objectives (you can also define one or two optional objectives). Try to be specific and not too vague, a good research objective should be measurable and an objective should be achievable. Maybe you can already describe what results you expect to achieve, or mention any hypotheses or predictions if applicable.
- **Approach and Methods**: Describe the theoretical or practical approach you will take to achieve your goals. If already known, name the programming languages, frameworks, libraries or software you intend to use. If applicable, specify data sets, simulations or

experiments and define how you will evaluate your experiments (e.g., classification accuracy, runtime evaluation, etc.).
- **Project Plan and Timeline** Provide a *Gantt chart* or timeline with key milestones. Break down the planned approach into phases (e.g., literature review, design, implementation, testing, writing).
- **References**: Cite all relevant sources using a proper format.

Send the finalized proposal to your supervisor – he will give you feedback. If your proposal …

- … is well written, complete and sound, you will simply receive a "go" to start your project.
- … contains few minor problems, you will receive written feedback (e.g., suggestions for improvement). The supervisor will let you know whether or not you need to resubmit the corrected version of the proposal.
- … contains major problems, a further meeting will be arranged (to re-discuss the topic).

Start and Duration

As soon as the confirmation from the director of studies has been received and the supervisor has approved your proposal, the thesis project officially starts.

The standard duration to complete a bachelor thesis is five months (extensions are allowed after consultation with the supervisor).

Writing Tools

A thesis has to be written with the aid of LaTeX not with Microsoft Word (or similar word processing software). For BSc theses a template is available on the PRG website. For MSc theses, a template is available on the JMCS website. Additionally, we recommend to use the following tools:

- `Overleaf`, `TexMaker`, or similar for LaTeX editing
- `BibDesk`, `Zotero`, or similar for managing the bibliography
- `GraphViz` for drawing graphs, trees, flowcharts, etc. Alternatively use `draw.io`, `OmniGraffle`, `LucidChart` (partly fee-based software and partly not available for all platforms)
- `GnuPlot`, `MatplotLib`, `Seaborn`, or similar for plotting data and results.

We also recommend using language tools such as `Deepl` or `chatGPT` to iteratively improve your own text fragments. What we do not recommend *under any circumstances* is to create entire paragraphs using these tools – we expect you to have a certain seniority in evaluating the results you get from these tools[1].

Length and Language

For BSc theses we expect a length of about 30 pages, for MSc theses about 50 pages are appropriate. These are – of course – rough rules of thumb. The actual number of pages of the thesis depends on the type and content of the scientific work.

BSc theses can be written in German or English (English is highly preferred). MSc theses must be written in English.

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[1]Misuse of chatGPT, or similar, can lead to an accusation of plagiarism.

Academic Writing

We expect you to study the Academic Writing document, which you can find on our website, very thoroughly and to strictly adhere to the tips and guidelines it contains when writing your thesis. The study of this document is an integral part of the PRG seminar.

Submission

The final version of a thesis consists of a single PDF file. Printed copies are not needed.

Assessment

The assessment of a BSc thesis consists of three grades:

- *Bachelorarbeit*: Assessment of the final version of the thesis
- *Seminar*: Assessment of the presentation given in the seminar (for details of the grading scheme we refer to the document *Information for the Pattern Recognition Seminar*)
- *Anleitung zu wissenschaftlichen Arbeiten*: Assessment of the scientific approach and procedure. In the vast majority of cases, this grade corresponds to the same grade as the grade for the thesis. In exceptional cases, however, the grade may differ – for example, to recognize a high level of commitment, a special innovation that goes beyond the initially defined objectives, or a particularly extensive and well-defined experimental evaluation.

The assessment of a MSc thesis consists of one grade and written statements on the following items:

- Has the candidate reviewed, integrated and cited relevant scientific literatures sufficiently?
- Qualification of the scientific research work of the candidate in terms of work organisation, personal effort, aptitude, creativity.
- Relevance of addressed questions and quality of obtained results. Have the aims of the study been met?
- Analytical abilities and interpretation of the results.
- Editorial formulation and layout of the thesis including figures and tables.
- Independent workability of the candidate.

Normally, we grade a submitted thesis within two to three weeks and offer – if desired – a discussion of the evaluation.

If a thesis has serious deficiencies, the thesis will be graded with a grade smaller than 4.0 (insufficient). Yet, if a thesis has deficiencies that can be corrected within a reasonable period of time, we might reject the initial submission. If the student decides to correct these deficiencies within a defined period of time, a passing grade is still possible (typically a grade of 4.0).