# GUIDE FOR THE PREPARATION AND ASSESSMENT OF THESES AND PROJECTS

*MSc in Energy and Environmental Engineering (MEEA)*

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## Contents

## 1. Purpose of this Guide

This document is intended for students, supervisors, and examination committee members of the MEEA, with the objective of:

- Clarifying the differences between a **Thesis** and a **Project**;
- Promoting common expectations regarding the quality of the work;
- Harmonising assessment criteria;
- Valuing not only the final document but also the student's ability to demonstrate mastery of the work undertaken;
- Mitigating risks associated with the inappropriate use of Artificial Intelligence (AI) tools, ensuring that grades genuinely reflect the competencies acquired by the student;
- Promoting good documentation and reproducibility practices, facilitating the independent validation of the results presented.

## 2. Thesis versus Project

### 2.1 Thesis

A thesis corresponds to a piece of work that is predominantly scientific and research-oriented.

The central question is:

*"What new knowledge was produced, or what scientific question was answered?"*

#### Typical Characteristics

- Formulation of a research question or hypothesis;
- Critical review of the state of the art;
- Clearly defined scientific methodology;
- Production of original results;
- Critical analysis and discussion of results;
- Identification of limitations and future perspectives.

#### Examples

- Evaluation of photovoltaic power generation forecasting algorithms;
- Experimental study of materials for energy storage;
- Impact of energy communities on grid flexibility.

### 2.2 Project

A project corresponds to a piece of work that is predominantly applied and engineering-oriented.

The central question is:

*"What solution was conceived, developed, implemented, or evaluated?"*

#### Typical Characteristics

- Solving a concrete problem;
- Development of technical solutions;
- Design and sizing;
- Multidisciplinary integration;

- Technical, economic and/or environmental assessment;
- Potential for implementation in a real-world context.

#### Examples

- Design of a photovoltaic power plant;
- Development of a decarbonisation plan;
- Design of a hybrid energy storage system.

## 2.3 Expected Differences Between the Documents

| Element | Thesis | Project |
|---|---|---|
| Main question | Scientific | Engineering |
| State of the art | Highly in-depth | Focused on existing solutions |
| Main contribution | New knowledge | Technical solution |
| Methodology | Scientific | Engineering/design |
| Results | Scientific evidence | Validated solution |
| Discussion | Central | Important but more solution-oriented |
| Implementation | Optional | Frequently essential |

## 3. Recommended Structure

### Thesis

- Abstract
- Introduction
- Literature Review
- Objectives and Research Questions
- Methodology
- Results
- Discussion
- Conclusions
- Future Work
- References
- Appendices

### Project

- Abstract
- Introduction and Context
- Review of Existing Solutions
- Requirements Specification
- Development Methodology
- Design and Implementation
- Validation and Evaluation
- Economic, Environmental, or Operational Analysis (where applicable)
- Conclusions
- References
- Appendices

## 4. Use of AI Tools

The use of generative AI tools (for example, ChatGPT, Copilot, Claude, Gemini, or equivalent tools) is permitted as a support tool during the development of the work.

However, the student remains fully responsible for all submitted content, including text, code, analyses, figures, results, and conclusions.

The use of AI does not replace the need for:

- Full understanding of the work undertaken;
- Validation of information obtained through AI;
- Compliance with academic integrity standards;
- Proper identification of sources and references.

## Mandatory Declaration of AI Use

All theses and projects must include a section entitled:

### Statement on the Use of Artificial Intelligence Tools

This declaration should be inserted after the acknowledgements section (or, if no acknowledgements are included, after the abstract) and should briefly and transparently describe the use of AI tools during the development of the work.

### Example

*During the development of this work, generative Artificial Intelligence tools (Microsoft Copilot and ChatGPT) were used to support language revision, improve writing clarity, and provide occasional assistance with programming. All generated suggestions were verified, reviewed, and validated by the author. The conception of the work, methodology, analysis of results, conclusions, and final writing are the sole responsibility of the author.*

## Levels of Use

The declaration should explicitly indicate which of the following uses occurred:

- Grammatical and linguistic revision;
- Text structuring or editing;
- Exploratory information search;
- Code generation or review;
- Data analysis support;

- Production of figures or images;
- Other relevant uses.

Whenever AI has been used to generate code, text, images, or content incorporated directly into the document, this use should be clearly identified in the declaration.

## Impact on Assessment

The use of AI tools is neither a positive nor a negative factor in itself.

However:

- Failure to declare significant AI use may be considered a lack of academic transparency;
- During the defence, the student may be questioned about any part of the work, regardless of whether AI tools were used;
- Inability to explain, justify, or reproduce decisions, analyses, code, or results presented in the work should negatively affect the final grade.

## Role of the Public Defence

The public defence is the primary mechanism for validating the intellectual authorship of the work.

Consequently, the assessment should place significant value on the student's ability to:

- Explain the rationale behind decisions made;
- Justify methodologies and assumptions;
- Critically interpret the results obtained;
- Discuss limitations and alternatives;
- Respond to unprepared questions.

The aim is not to verify whether AI tools were used, but rather to confirm that the student has genuinely acquired the knowledge, skills, and critical thinking abilities expected from a master's-level project.

## 5. Reproducibility and Availability of Materials

The document should be prepared so that a person with appropriate technical training in the field can independently understand, analyse, and reproduce the main procedures, methodologies, and results presented.

Whenever applicable, students should provide complementary documentation enabling validation of the results, including:

- Developed source code;
- Data processing and analysis scripts;
- Computational models;
- Configuration files;
- Datasets used;
- Installation and execution instructions;
- Technical documentation required to reproduce experiments, simulations, or analyses.

These materials may be made available through:

- Appendices;
- Institutional repositories;
- Platforms such as GitHub;
- Other appropriate mechanisms.

### Acceptable Limitations

Full disclosure of materials may not always be possible due to:

- Industrial or commercial confidentiality;
- Protection of personal data;
- Third-party intellectual property rights;
- Confidentiality agreements with external entities;
- Use of licensed software, databases, or content.

In such cases, the document should explicitly identify these limitations and describe, as far as possible, the procedures, methodologies, and materials used, enabling understanding and evaluation of the work performed.

## 6. Assessment

### General Principles

The final grade should reflect:

- Technical or scientific quality of the work;
- Student autonomy;
- Capacity for critical analysis;
- Effective mastery of the subject.

The public defence is considered a fundamental assessment component.

### Proposed Assessment Rubric

The weightings assigned to the different criteria and subcriteria should be regarded as indicative and guiding values rather than a rigid formula for calculating the final grade.

#### Written Component (60%)

##### *A. Document Quality (20%)*

| Criterion | Weight |
|---|---|
| Organisation and structure | 4% |
| Writing clarity | 4% |
| Quality of figures and tables | 4% |
| References and academic rigour | 4% |
| Transparency and reproducibility | 4% |

##### *B. Technical or Scientific Quality (30%)*

Thesis

| Criterion | Weight |
|---|---|
| Literature review | 6% |
| Formulation of scientific question | 4% |
| Methodology | 8% |
| Results | 6% |
| Critical discussion | 6% |

Project

| Criterion | Weight |
|---|---|
| Problem definition | 4% |
| Review of existing solutions | 4% |
| Solution design | 8% |
| Implementation and validation | 8% |
| Technical discussion | 6% |

### *C. Originality and Autonomy (10%)*

| Criterion | Weight |
|---|---|
| Demonstrated initiative | 4% |
| Problem-solving ability | 3% |
| Originality of approach | 3% |

## Public Defence (40%)

### *D. Presentation (10%)*

| Criterion | Weight |
|---|---|
| Presentation structure | 3% |
| Clarity of presentation | 3% |
| Time management | 2% |
| Quality of supporting materials | 2% |

### *E. Discussion and Examination (30%)*

| Criterion | Weight |
|---|---|
| Overall mastery of the work | 10% |
| Understanding of methodology | 6% |
| Ability to justify decisions | 5% |
| Critical discussion of limitations | 4% |
| Ability to answer unexpected questions | 5% |

## Recommendations for the Examination Committee

During the oral examination, it is recommended to include questions that assess:

### Deep Understanding

- Why was this methodology chosen?
- What alternatives were considered?
- What is the main result obtained?

### Robustness

- What would happen if certain assumptions were changed?
- What are the main sources of uncertainty?

### Authorship

- How was this specific part implemented?
- Why was this equation used?
- How were these parameters obtained?

### Critical Thinking

- What would you do differently if you started the work again?
- What is the main limitation of the study?
- What is the main opportunity for continuation?

### Reproducibility

- Can the presented results be reproduced by third parties?
- What materials were made available for this purpose?
- What are the requirements needed to run the code or reproduce the simulations?

## Recommended Grading Scale

| Grade | Interpretation |
|---|---|
| 18–20 | Exceptional work; demonstrates complete scientific/technical mastery and high critical maturity |
| 16–17 | Very good work; strong mastery and solid discussion |
| 14–15 | Good work; objectives achieved with adequate quality |
| 12–13 | Satisfactory work; some significant weaknesses |
| 10–11 | Minimum work required for passing |
| <10 | Objectives not achieved |

## Final Message to Students

Assessment is not intended solely to measure the quality of the submitted document. The primary objective is to evaluate the student's ability to formulate problems, develop solutions or generate knowledge, interpret results, and critically discuss their work.

An excellent document without genuine mastery of its content should not lead to a high grade. Conversely, a student who demonstrates deep understanding, critical thinking, and autonomy should see these competencies clearly reflected in the final assessment.