



**REGULATIONS FOR THE ASSIGNMENT, COMPLETION AND ASSESSMENT OF THE FINAL
EXAMINATION FOR THE AWARD OF THE MASTER'S DEGREE IN
ENVIRONMENTAL ENGINEERING FOR SUSTAINABLE DEVELOPMENT AND GREEN
INDUSTRIAL ENGINEERING FOR SUSTAINABLE DEVELOPMENT**

INTRODUCTION

This document constitutes the regulations approved by the Board in Civil and Industrial Engineering of the Latina Campus on 25 June 2014, and subsequently updated by a further resolution on 24 January 2020, with the aim of ensuring transparency in the procedures for the assignment, completion and assessment of the final examination for the Master's Degree Programme in Environmental Engineering for Sustainable Development and Green Industrial Engineering For Sustainable Development.

The procedures outlined in these regulations refer to the Academic Office and are complementary to those that must be followed by students through the Student Office. For the latter procedures, reference should be made to the relevant website.<https://www.uniroma1.it/it/pagina/segreteria-amministrativa-dei-corsi-con-sede-latina#domanda-di-laurea>

FINAL EXAMINATION

The final examination of the Master's Degree consists of the preparation of a dissertation requiring a workload corresponding to 24 ECTS credits.

ASSIGNMENT

For the purpose of assignment, the student must collect the appropriate form from the Academic Office and, after having it signed by the Supervisor, submit it to the same Academic Office no later than 180 days before the date of the graduation session.

The assignment may be requested when no more than three examinations remain to be completed in the study programme, without prejudice to the Supervisor's right to assign the thesis only after the student has passed all examinations.

COMPLETION

The dissertation must comply with the requirements described in the guidelines, which form an integral part of these regulations (see Annex B).

ASSESSMENT

Up to 10 points may be awarded for the Master's dissertation, allocated as follows:

- up to a maximum of 4 points awarded by the Supervisor;
- up to a maximum of 5 points awarded by the Examination Committee;
- 1 point if the study programme is completed within the minimum required time (2 years).

In the case of particularly outstanding dissertations that have resulted in scientific publications, the Committee may decide to award an additional point.

The honours distinction (cum laude) may be awarded only by unanimous decision and only if the starting average exceeds 102/110.

ANNEX B

GUIDELINES FOR THE PREPARATION OF THE MASTER'S THESIS IN ENVIRONMENTAL ENGINEERING FOR SUSTAINABLE DEVELOPMENT AND GREEN INDUSTRIAL ENGINEERING FOR SUSTAINABLE DEVELOPMENT

INTRODUCTION

These guidelines are intended to provide students who are about to write the Master's thesis in Environmental Engineering for Sustainable Development and Green Industrial Engineering For Sustainable Development with clear and precise instructions on the organisation and drafting of the work, both in terms of structure and formatting. The objectives pursued are therefore twofold:

- from a substantive perspective, the aim is to give greater emphasis to the work actually carried out by the candidate, providing guidance to improve the presentation of the topics addressed;
- from a formal perspective, the aim is to achieve graphic and layout uniformity of the dissertations, specifically for Master's theses in Environmental Engineering for Sustainable Development and Green Industrial Engineering For Sustainable Development.

STRUCTURE AND TYPES OF THESIS

The text of the thesis must be divided into sections, which must be clearly defined. Each section has a title, which should appear on a separate line. Below, the three types of thesis provided are presented, together with a description of their structure.

The Table of Contents must be placed before the Introduction, while one or more Appendices may be included after the Bibliography.

The sections of a thesis are logical and conceptual blocks that develop major themes and are further divided into thematic sub-blocks, chapters, and paragraphs, which progressively develop the general content of each section. Paragraphs may in turn be divided into sub-paragraphs when specific topics require more detailed discussion.

A brief description of the contents that should be included in each section is provided below, bearing in mind that the content must be appropriately balanced with respect to the different sections characterising the various types of thesis outlined below.

EXPERIMENTAL THESIS

The structure of an experimental thesis should include the following sections:

- Introduction
- Materials and Methods
- Experimental Results
- Discussion
- Conclusions
- Bibliography

INTRODUCTION

In the Introduction, the motivations and objectives of the work are described, the content of the thesis is briefly outlined, and the state of the art on the topic under investigation is also presented.

MATERIALS AND METHODS

This section is commonly divided into two subsections, namely "Materials" and "Methods". In "Materials", the different types of samples considered and analysed during the experimental work are listed and described. For each type of sample, the number of samples, their origin, the initial characteristics (i.e. those prior to the experimental analysis), and any sampling procedures must be specified. It is useful to include one or more summary tables reporting the abbreviations used to identify the samples and their main characteristics, as well as one or more representative images of the samples themselves.

In "Methods", the types of analyses carried out on the samples are described, including both analytical-instrumental methods and software-based methods for data processing. For each method, the instrument used must be specified, indicating the manufacturer, model, operating conditions, and, where appropriate, technical specifications. In the case of software, the name, developer, and version used must be reported. For each analytical methodology adopted, it is advisable to include a description of the theoretical principles on which it is based and of its operating principles, especially when innovative techniques are employed.

Where necessary, this section may also include a subsection entitled "Experimental Procedure", in which the procedure followed for sample analysis is described in detail.

RESULTS

In this section, the results obtained for all types of samples are presented and described, with reference to each of the analytical methods outlined in the previous section. The results must be reported without commentary or interpretation. Clearly, the results for each investigative methodology should be presented following the same order in which they were introduced in the preceding section. It is useful to include summary tables and graphs of the results obtained.

DISCUSSION

This section may also be combined with the "Experimental Results" section. In any case, the discussion of the results must analyse and interpret the data, highlighting the significance of the findings and critically evaluating them, also by comparing them with data reported in the literature.

CONCLUSIONS

In the conclusions, a summary of the work carried out is provided and the main results obtained are synthesised, highlighting their significance with respect to the issue addressed. Possible future developments of the research may also be introduced.

DESIGN THESIS

The structure of a design thesis should include the following sections:

- Introduction
- State of the Art
- Case Study Analysis
- Design Proposals

- Conclusions

INTRODUCTION

In the Introduction, the motivations and objectives of the work are described; the methods, techniques, and tools used are cited; and the overall research and design process, the places where the work was carried out, and any collaborations are briefly outlined.

STATE OF THE ART

In this section, a reflection is developed on how the issue addressed is approached within the scientific discipline chosen to support the thesis. Both the main theoretical and methodological contributions currently available in the literature and the most significant applied experiences at national and international level are highlighted, with particular attention to those relevant to the selected case study.

CASE STUDY ANALYSIS

The case study consists of a work, facility, plan, or other engineering project located within a spatial context that may range from the site scale to the broader territorial scale. The context of the case study is analysed in all its environmental components relevant to the project. The main issues emerging from the current state of the area are highlighted, together with the methodologies and techniques considered most suitable to ensure optimal project performance, both in relation to socio-economic development objectives and to environmental impact.

DESIGN PROPOSAL

Based on the evidence emerging from the case study analysis, one or more design proposals are defined through the adoption of appropriate methodologies and techniques, possibly including experimental approaches.

CONCLUSIONS

The conclusions provide a summary of the work carried out and synthesise the main results obtained, highlighting their relevance to the issue addressed. Possible future developments of the research may also be introduced.

THEORETICAL THESIS

It should be noted that this type of thesis is particularly demanding and has no compilative nature. It is suitable for students who intend to develop a methodology or technique of particular complexity, which cannot be fully applied experimentally or through design activities within the resources and timeframes corresponding to the credits assigned to the thesis.

The structure of a theoretical thesis should include the following sections:

- Introduction
- State of the Art
- Proposed Method or Technique
- Discussion
- Conclusions

INTRODUCTION

The introduction describes the motivations and objectives of the work, cites the methods, techniques, and tools used, and briefly outlines the research pathway, the places where the work was carried out, and any collaborations.

STATE OF ART

This section develops a reflection on how the topic addressed is treated within the scientific discipline chosen to support the thesis. It highlights both the main theoretical and methodological contributions currently available in the literature and the principal applied experiences at national and international level.

PROPOSED METHOD OR TECHNIQUE

The proposed method or technique is illustrated by highlighting both its main innovative aspects and the elements that are already well established in practice..

DISCUSSION

The discussion of the proposed method or technique provides a critical evaluation of its potential strengths and limitations, also in comparison with the indications emerging from the state-of-the-art section.

CONCLUSIONS

The conclusions summarise the work carried out and synthesise the main results obtained, highlighting their importance with respect to the issue addressed. Possible future developments of the research may also be introduced.

THESIS FORMAT

The thesis must be complete and graphically consistent, and all pages must be numbered consecutively according to the sequence of sections. The minimum required length is 50 pages.

TITLE PAGE

The title page of the Master's thesis must include the following information:

- Sapienza University of Rome;
- Faculty of Civil and Industrial Engineering;
- Master's Degree Programme in Environmental Engineering for Sustainable Development;
- Title of the thesis;
- Name of the candidate;
- Name of the supervisor (and, where applicable, of the co-supervisor(s));
- Academic year to which the graduation session refers.

At the end of this annex, a title page template is provided.

TITLE

The title should be as concise and informative as possible. It is preferable to avoid the use of formulas and abbreviations in the title. A full stop should never be placed at the end of the title.

TABLE OF CONTENTS

The table of contents must be prepared in the clearest and simplest way possible and must include all chapters, sub-chapters, and paragraphs of the text, using the same numbering, page references, and wording. Defining the table of contents does not merely mean arranging the contents sequentially, but also establishing their logical development.

ABBREVIATIONS

Abbreviations must be written out in full the first time they appear in the text; thereafter, they may be used in abbreviated form (for example: the first occurrence should read “polyethylene (PE)...”, while subsequent occurrences may read “PE...”).

MATEMATICAL FORMULAS

Formulas must be centred, and their progressive numbering must be placed on the right margin in parentheses. For example:

$$W = 10W_i \left(\frac{1}{\sqrt{d_{80}}} - \frac{1}{\sqrt{D_{80}}} \right) \quad (1.1)$$

W = energy required for comminution (kWh/sht), where 1 sht = 0.908 t;

d₈₀ = size (mm) below which 80% of the comminuted mass is collected;

D₈₀ = size (mm) below which 80% of the feed mass to the comminution process is collected;

W_i = Work Index (kWh/sht), characteristic of each material.

FIGURES

Figures must be inserted in the text as soon as they are cited for the first time and must be referred to at least once in the text.

Each figure must be accompanied by a caption placed below it, allowing its meaning to be understood even without reading the main text.

Figures must be numbered in progressive order, and it is advisable that numbering restart within each chapter. For example, following this criterion, the third figure in the second chapter should be indicated as Fig. 2.3.

If it is necessary to use original figures taken from other publications (books, articles, theses), the source must be cited.

Graphs are to be considered as figures. If figures represent images of samples, a reference scale must be included on one edge of the image.

Figures must be centred with respect to the text. Example:

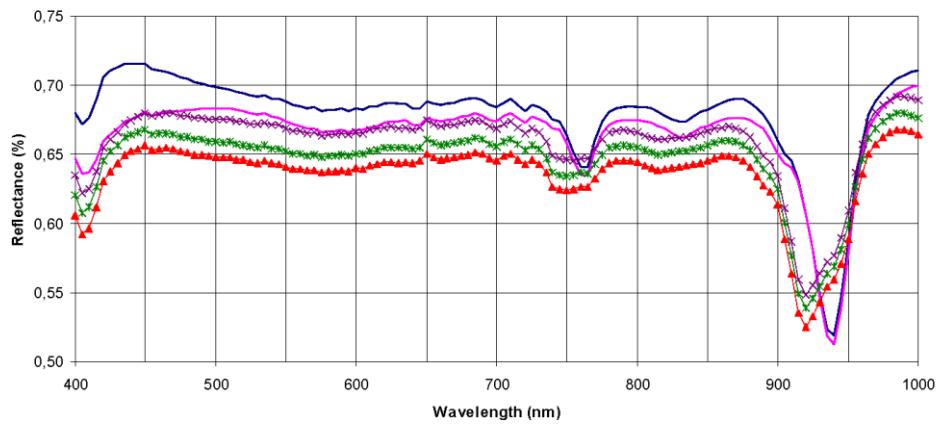


Figure 3.1 – Average reflectance spectra in the visible–near infrared range (400–1000 nm) of the five plastic samples used as reference standards. For the meaning of the legend, see the text.

TABLES

Tables must be inserted in the text as soon as they are cited for the first time and must be referred to at least once in the text. Above each table, a title must be provided, allowing its meaning to be understood even without reading the main text.

Tables must be numbered independently from figures, following the same numbering criterion. If it is necessary to use original tables taken from other publications (books, articles, theses), the source must be cited.

If tables contain numerical values, attention must be paid to the right alignment of numbers and to the consistency of the number of decimal places reported for each data series. For example, the following values are incorrect: 0.1, 0.25, 0.341; the correct format is: 0.10, 0.25, 0.34.

Tables must be centred with respect to the text.

Tabella 2.2 - Process variables during autogenous milling treatment.

No. of experiment	Residence time (min)	Reflux	Total mill input (t)	Mill output label	Weight of dry sample (kg)
2	6	no	8.1	2-AS	9.29
2	12	no	7.6	2-BS	11.78
3	6	yes	9.3	3-AS	9.93
3	12	yes	8.7	3-BS	9.85
4	6	yes	16.1	4-AS	14.50
4	12	yes	15.1	4-BS	17.22

BIBLIOGRAPHY

The functions of bibliographic citation are fourfold:

- to acknowledge the origin of a statement, data, or figure;
- to support and substantiate the author's argument;
- to indicate the presence of authors who disagree with what is stated;
- to refer the reader to sources that provide further discussion of specific aspects.

It is important that the candidate always clearly indicates the origin of statements, data, or figures taken from other sources. Generally, the citation (Author and Year of Publication) is placed at the end of the sentence in which an author's statement is introduced for the first time.

In the text, the author's surname followed by the year of publication must be reported. In the case of two authors, the surnames of both are indicated; in the case of three or more authors, only the surname of the first author is reported, followed by "et al." and then the year of publication. Examples: (Gowen, 2011); (El Masry and Sun, 2012); (Geladi et al., 2008).

The bibliography must contain all the elements necessary to identify and, where applicable, retrieve the sources cited in the text.

In the bibliography, references must be listed in alphabetical order by the author's surname. When multiple works by the same author are present, they should be ordered chronologically.

Single-author works should precede multi-author works. The bibliography must include only the authors cited in the thesis.

Bibliographic Style

Bibliographic references must include: the author's surname and the initial(s) of the given name, followed by the year of publication, the title of the work, and the other relevant details such as the journal title, volume, page numbers, or the title of the book, etc., using the punctuation and font style indicated in the examples below.

Reference to a publication in a scientific journal:

Van der Geer J., Hanraads J.A.J., Lupton R.A., 2010. The art of writing a scientific article. *J. Sci. Commun.* 163, 51–59.

Reference to a book:

Strunk Jr. W., White E.B., 2000. *The Elements of Style*, fourth ed. Longman, New York.

Reference to a book chapter:

Mettam G.R., Adams L.B., 2009. How to prepare an electronic version of your article, in: Jones, B.S., Smith , R.Z. (Eds.), *Introduction to the Electronic Age*. E-Publishing Inc., New York, pp. 281–304.

Web References:

In Web References (or Webography, if Bibliography is used instead of Bibliographic References), the websites consulted from which textual quotations have been taken must be included. If, however, a text with a specific title and author has been taken from a website (for example, contained in a PDF file), the reference to that text must be included in the standard bibliography, indicating the name of the website in place of the publisher.

The full web address (URL) must be reported.

<http://www.plasticseurope.org/Document/plastics---the-facts-2011.aspx>

APPENDICES AND ANNEXES

The purpose of appendices and annexes is to include supplementary material that the candidate considers relevant but which would overly burden the main body of the thesis. Appendices must therefore have logical autonomy, allowing such material to be placed separately from the pages it supplements.

- Appendices generally contain material produced by the candidate to complement the main body of the thesis; they may therefore include operational details of the research method adopted, a glossary of the most frequently used technical terms throughout the thesis, sets of tables relating to large amounts of data obtained, and similar material.
- Annexes include material from other sources, usually reproduced in its original form without further processing; for example, the text of the questionnaire used, the composition of the sample under investigation, the regulations most frequently referred to, or other documents of particular relevance.

It is advisable to include one or more appendices when the presence of a large amount of generated data would excessively weigh down the main text. Each appendix must be identified by a letter of the alphabet, such as A, B, etc. Formulas, equations, figures, and tables included

in the appendices should have a separate numbering system, incorporating the identifying letter of the appendix itself (e.g., Eq. A.1, Table A.1, Figure A.1, etc.).

LAYOUT SUGGESTIONS

Paper size: A4

Margins: top 3 cm, bottom 3 cm, right 3 cm, left 3 cm; binding margin 1 cm

Font: Times New Roman, size 12

Paragraph line spacing: 1.5

Alignment: justified

Lines per page: 30 (± 1)

Page numbering: insert the page number at the bottom centre

Headings:

Chapter titles: uppercase, size 14, bold

Section titles: lowercase, size 14, bold (double spacing after headings)

Double-sided printing is recommended in order to respect the environment.

Only one printed copy of the thesis is required and must be brought on the day of the thesis defence.

TITLE PAGE (TO BE ADAPTED TO THE PAGE LAYOUT)



SAPIENZA
UNIVERSITÀ DI ROMA

FACULTY OF CIVIL AND INDUSTRIAL ENGINEERING

**MASTER'S DEGREE PROGRAMME IN
ENVIRONMENTAL ENGINEERING
FOR SUSTAINABLE DEVELOPMENT**

MASTER'S THESIS
Title of the thesis

STUDENT:Xxxxxxx Xxxxxxxxxxxxx

SUPERVISOR:

Prof.Ing. Xxxx XXXX

CO-SUPERVISOR:
Xxxx XXXXX

A.A. 20XX-YY