

LM-DATA: Data Science

Data Science for Economics and Health



UNIVERSITÀ
DEGLI STUDI
DI MILANO

LA STATALE

Dipartimento di Informatica
"Giovanni Degli Antoni"
Dipartimento di Economia,
Management e Metodi
quantitativi

Dissertation essentials



- The dissertation (or thesis - tesi) is an individual, in-depth research project demonstrating subject expertise and analytical skills
- During the preparation of the dissertation, an advisor (relatore) and a co-advisor (correlatore) must be identified to supervise the thesis progresses
- An adjunct co-advisor may be indicated if the thesis work involves external companies, institutions, or universities in Italy or abroad
- Both the advisor and the co-advisor must be specified when the student applies for graduation
- The dissertation is worth 12 credits in the study plan

Types of dissertation



The dissertation can be:

- A **methodological research project** aimed at obtaining a novel scientific result in terms of methods and/or techniques
- An **applied research project** aimed at analyzing and solving an open problem

Choice of the dissertation topic



- As a rule, the thesis topic is proposed by the student. In this case, the student must submit the proposal to professors of the Faculty Board that can be interested to act as advisor and co-advisor
- It is also possible to apply for a thesis proposed by an advisor in the [call for thesis](#) folder
- In both cases, the dissertation is formally assigned by the advisor that agrees to supervise the work

Choice of the dissertation topic



- Be inspired by insights coming from attended courses, laboratories, conferences, web resources (e.g., blogs, specialized websites), contacts with companies or public institutions
- Start reading papers or articles and/or thinking about the challenges and issues faced during internships or other experiences
- Be creative (try to generate up to 10 ideas and select your best options based on feasibility and/or originality)

Defining the research question



- Think about an **interesting research question** with a focused context and clear applications
 - Be sharp in defining the context and the research question
 - Working on a wide topic and generic research questions risks to produce abstract conclusions without experimental support
- **Relevance and originality are crucial**, as well as the ability to effectively answer to the research question

Defining the research question



- Check the feasibility of the thesis
 - What do you need in terms of data and experiments? Are there any potential risk?
- For example:
 - If you plan to analyze empirical data, are they available? Is there a dataset already there? Who owns data you need? How long does it take to collect data? Is the sample large enough to make analysis? Do you have the skills to perform the analysis you want to perform?
 - If you plan to have interviews or cases, how many informants do you have to involve to reach solid conclusions? Is it feasible to reach them? Do you have links with companies? Are you aware of the methodology you want to apply?

Development of the project



The work must include:

- **Problem statement** with clear definition of the research issue that the thesis aims to address (currently unsolved in the literature)
- **In-depth literature review**
 - State-of-the-art solutions (existing theories and models on the topic)
- **Research methodology**
 - Methods chosen to address the problem
- **Analysis** and discussion of data
- **Experimental results** and conclusions

Discussion and conclusions



- Even though discussion and conclusion are the last step in the thesis work, it is important to envisage the potential contributions of your study from the very beginning: What do you expect to find out and demonstrate?
- It is not a matter of deciding the outcome of the analysis ex ante. It is a matter of not being trivial or too generic. It represents a further test of the validity of your research question

Final defense



- Students must defend their thesis in front of a panel composed of Faculty members
- A student has about 10 minutes to present the thesis work with the (optional) support of a PowerPoint presentation
- The presentation is a decisive moment for the final assessment of the thesis work
 - Be effective and choose the relevant points to touch: most of the panel members do not know the thesis work in detail and their evaluation is mostly based on your presentation
 - Consider that while it is hard to have an impressive presentation of a poor study, it is not that rare to ruin a good thesis work with a poor presentation

Final defense



- Possible points to cover in the presentation:
 - Objective of the thesis
 - Adopted methodology
 - Key results
 - Contributions and implications

The advisor and the co-advisor



- The advisor and the co-advisor are the supervisors of the thesis work with a role of guidance and acts as facilitators in developing the research
- The advisor is the main reference person during the thesis work
- The co-advisor can be also involved when appropriate with respect to the focus of the thesis and the fields of expertise of the co-advisor
- The advisor (and the co-advisor if relevant) must be periodically informed about the progresses
- Frequency and modalities of checkpoints on the thesis work can be agreed with the advisor

The advisor and the co-advisor



- The advisor and the co-advisor **are not** assistants
- The advisor and co-advisor **are not** expected to:
 - Define the research question
 - Find the data
 - Provide literature references
 - Structure the thesis (don't ask: "What do I have to do?" Rather: "I see two alternatives, and I would go for the first one for the following reason. Do you agree?")
 - Proofread or check orthography
 - Remember administrative deadlines, interact with offices

When to start the dissertation



- The dissertation can start when a topic is defined and shared with a Professor that agrees to act as the advisor
- Consider that **four months** are an appropriate full-time period to develop a dissertation
- Consider to anticipate the dissertation work if one or two exams are still pending (not yet passed)
- Consider to pass all the mandatory courses and most of the elective courses before starting to work on the dissertation
 - Courses provide the necessary knowledge and skills to work on the thesis
 - Courses contribute to inspire on possible research questions to investigate

How to find advisor and co-advisor



- The advisor must be a professor of the Faculty Board involved in DSEH
- Consider to contact professors that have expertise on the topic you are proposing, starting from those met in courses (or modules) of DSEH
- You can contact potential advisors in the office hours or by email. It is a good idea to introduce yourself with a concrete idea supported by a short abstract of what you propose
- The co-advisor should be chosen with the support of the advisor to provide complementary expertise that is useful in the development of the thesis work

Writing the thesis



Originality

- The thesis must be an original work of the candidate
- Plagiarism is not only ethically wrong but also a severe violation of the Honour Code. Disciplinary sanctions are imposed (e.g., postponement of the defense date; change of the advisor; new dissertation topic, capped final mark)
- All dissertations will be checked for plagiarism via the detection service
Compilatio
- Accurate referencing and bibliography is an important element of the thesis. Students must adopt a standard citation system and bibliography format

Writing the thesis



Structure and organization

- Template structure of the thesis (not mandatory):
 - Frontpage (see the template on the [DSEH website](#))
 - Table of contents
 - Abstract
 - Introduction
 - Main content (literature review, methods, discussion, results) in 3 or 4 chapters
 - Concluding remarks and future work
 - References
 - Appendices (if applicable)

Writing the thesis



Format

- The thesis must be written and defended in English
- The length of the thesis is about 70-100 pages, including notes, tables and attachments

Writing the thesis



Format

- Paper: A4 size (210 x 297 mm)
- Font: Arial 12;
- Interlinea/linespace: 1.5
- Margins: not less than 38mm on the left side; 30mm on other sides
- Pages, Tables, and Diagrams must be numbered
- A Latex template is available on the [DSEH website](#)

Timeline



- **Proposal** (about four months before the graduating session)
 - Contact potential advisors and discuss/define the thesis topic
- **Assignment**
 - The thesis is formally assigned by the advisor
- **Development**
 - The work is carried out with regular meetings with the advisor and co-advisor
 - The advisor and co-advisor must approve the dissertation submission
 - Consider to agree with the advisor an appropriate amount of time before the submission deadline for thesis review and subsequent revision

Timeline



- **Submission**

- The student submits the thesis following the formal procedures and deadlines (see the [DSEH website](#))
- The student is responsible for checking deadlines and acting in compliance with formal procedures
- The advisor and the co-advisor **can stop** the graduation application if they do not receive the thesis in due time for review

- **Defense**

- The student must present the thesis work in front of the assigned panel
- The student presents the work with the optional support of a PPT
- The student must be prepared to answer questions issued by the panel

Evaluation



Points	Level	Evaluation
0-1	Sufficient	Purpose and objectives are clearly stated and of some relevance. There is basic coverage of relevant literature, methodology is reasonably explained with some attempt to use evidence to reach appropriate conclusions.
2-4	Fairly good	Well stated purpose, good coverage of prior research, clear and relevant methodological approach, some critical evaluation of results
5-7	Good	Objectives are innovative and very clearly stated, comprehensive and inclusive literature, very relevant methodological approach and good critical evaluation of results
8	Excellent	Exceptionally well stated purpose, creative and critical engagement with prior research. Rigorous theoretical understanding of the chosen methodological approach and sophisticated critical discussion of results (in general also for Research Dissertation)