

Master in Statistical Data Analysis

Master Thesis

Administrative information

Promoter and co-promoter

The promoter takes responsibility for the coaching of the master dissertation. She/he must be a member of the academic faculty of Ghent University or a temporary or permanent postdoc of Ghent University or of the Fund for Scientific Research - Flanders. The promoter belongs to the Examination Board of the master training and must be approved by the Examination Board if he/she is not a regular teacher in the program. Besides the promoter, a co-promoter can be appointed. Co-promoters are chosen because of their substantive expertise, have acquired a PhD and work at a university or a scientific institution or organisation. The co-promoter must also be approved by the Examination Board. If, by unforeseen circumstances, the promoter becomes unavailable during the course of the master dissertation, then the chair of the Examination Board ensures that a successor is available.

Plagiarism

Plagiarism is sanctioned according to the examination regulation of Ghent University. Ghent University has software to automatically scan files for detecting plagiarism. This application will be systematically used for all thesis reports. To this end, the thesis report has also to be submitted through Ufora (see later).

Attainment targets and final competences

In this section the attainment targets of the master thesis are listed (copied from the Course Specification document).

1. Can work independently with a sense of precision.
2. Show responsibility regarding data, ethics, scientific integrity and society.
3. Can consult information sources and extract relevant information.
4. Can report accurately and critically about the study objectives, methods, processes and final conclusions, both in oral and in written form.
5. Can conduct a large study, including all research steps necessary to move from a well formulated research question to an evidence based conclusion.
6. Show openness towards new scientific developments.

Contents of the master thesis

The master dissertation must reflect new, original and own work, related to empirical research in a specific domain. It may be related to design, analysis, algorithms, software implementation and/or methodology. In principle, the content of the master

dissertation has not been published before. However, when the research work of the student has contributed to a publication in the research group where the research project was implemented, then it is possible to make use of the corresponding results in the master dissertation. Each master thesis must include a data analysis, with mathematically precise formulation of the statistical model that was used, along with careful interpretation of the results and conclusions. Careful interpretation includes the consideration and reporting of the uncertainty of the obtained results, as well as a discussion and assessment of the testable and untestable assumptions on which these results rely. It is moreover important that the thesis concludes with an epilogue or paragraph(s) in which the policy consequences and implications of the results of the data analysis are discussed in a manner that is evidence-based and communicates the conclusions from the work to a broad audience with diverse scientific backgrounds. This content can alternatively be a video, a web application, a website, etc ... accessible to a wide, non-statistical readership.

Reproducible science is crucial in any piece of research. The thesis has to contain enough information for the data analysis results to be reproduced by a reader with good statistical competences. This implies that the statistical methodology and the considered statistical models should be communicated with sufficient detail and accuracy so that it is clear without ambiguity how the statistical analysis was performed. This additionally implies well documented and reproducible R code (or any other code used for data analysis or simulations).

The master thesis consists of three components: (1) the pre-defense; (2) the thesis report; (3) the public defense.

Announcement of subjects, assignment of topics to students and submission of thesis

- In the beginning of the academic year a sample of thesis subjects are listed on plato.we.ugent.be. For each thesis subject the title, a brief description of the thesis and the name of the promoter (and the name of the co-promoter, if applicable) are provided. Students are expected to inform themselves about the specifics of thesis subjects that are of interest to them by contacting the promoter(s). Note that only a sample of thesis subjects is posted; thus promoters may have more thesis subjects available. The student is encouraged to talk to the various professors in the program, even those who did not provide thesis topics, to learn about possible other thesis subjects, or to suggest her/his own thesis subject to a potential promoter(s). A thesis subject cannot be approved by the Faculty when no promoter is prepared to supervise the thesis. The student should therefore have obtained the permission of a promoter before she/he may submit his thesis subject (see next point).
- No later than November 15, the student makes a decision whether or not he/she will defend the master thesis in the current academic year and makes this decision formal through the selection of courses in the Oasis system. Changes thereafter are not generally allowed by the Faculty Student Administration. Students only need to be registered for the master thesis in

the academic year that they will defend the master thesis. Thus, when a student plans to start working on the thesis in a given academic year, but only submit the thesis in the subsequent academic year, then no official registration for the master thesis is required in the initial year.

- The student is responsible for submitting the title of the thesis and the name of the promoter via Oasis as soon as the name of the promoter is known.
- Several months before the student submits her/his master thesis report, she/he has to give a poster presentation about the thesis work, to which all MaStat lecturers and MaStat students are invited. On this occasion, the student prepares a poster about the research question, the formulation of the objectives and an outline of the methods that will be used to reach the thesis objectives. During the pre-defense the student presents the poster to the audience (i.e., no formal, plenary presentation, but an informal explanation of the poster to the attendants). Afterwards the audience may ask questions and/or give suggestions. In particular, fellow students are strongly encouraged to attend these seminars and participate in the discussions.

This part of the master thesis work is compulsory, but no score is given. The exact dates of these pre-defense seminars will be timely announced on the MaStat info-site on Ufora. The Program Committee covers the expenses of the poster printing, unless the student prints the poster him/herself. To have the poster printed, the student should send the poster in electronic format to mastat@UGent.be at least one week prior to the poster defense.

- The master thesis can be defended in one of the three examination periods of the academic year. The exact dates (of the deadline of the submission of the thesis report and of the defense) will be announced on Ufora. See the section on the assessment for more details.

The thesis must be uploaded electronically via Ufora (click [here](#) for details), along with structured software code, relevant software output and, if permission is granted by the owner of the data, the data that were used.

Student's and promoter's rights and responsibilities

- As soon as the thesis subject is officially confirmed, the student makes an appointment with the promoter to set a time schedule.
- The promoter may appoint a tutor to assist with the supervision of the thesis. This tutor must have a master diploma. The final responsibility, however, remains with the promoter. It is the responsibility of the promoter to explain clearly the objectives of the thesis, to provide the data timely (if applicable), and to provide the student with a few key references.
- The student and the promoter (or tutor) should have a sufficient number of meetings. Meeting at least once a month with the promoter, co-promoter or tutor is recommended. At these meetings the student and the promoter discuss the content of the thesis, the progress of the work and the learning process. It is the responsibility of the student to contact the promoter for setting up these meetings.
- When there are problems with the availability of the promoter or tutor, the student is to first discuss this with the person concerned. If this brings no

resolution, the student may inform the chair of the Program Committee (Prof. Dr. Stijn Vansteelandt), the chair of the Examination Committee (Prof. Dr. Els Goetghebeur), the Mastat coordinator (Dr. Koen Plevoets) or the ombudsperson of the Faculty of Sciences (Prof Dr. Maarten Baes). They will look for a solution.

- To be eligible for the master thesis defense, the student must submit a final draft of the thesis to the promoter at least 3 weeks prior to the defense date (so that the promoter – who often has many theses to read – can give feedback) and must submit the final thesis at least one week prior to the defense date to the promoter and commissioners.
- The MaStat Program Committee foresees possibilities for a master thesis at a company or scientific institution; for regulations, please see the corresponding document on the Infosite at Ufora.

Research Data Management

The Ghent University Policy Framework on Research Data Management (<https://www.ugent.be/en/research/datamanagement/policies/rdm-policy.pdf>) should be read in conjunction with the Ghent University Policy Plan on Research Integrity (<https://www.ugent.be/intranet/en/research/research-integrity/ri-en-fulltext.pdf>), prior to starting the Master thesis. In particular, research data should be (temporarily) restricted in certain circumstances, particularly in order to protect personal data or other confidential or sensitive information, to seek protection for research results subject to valorisation under intellectual property right (e.g. patents), or to comply with contractual obligations when the research data are the subject of third-party contracts (such as Research and Service Agreements, or Material Transfer Agreements). Students are primarily responsible for the careful management of the research data they collect, generate, and/or obtain from third parties in order to ensure that the data are reliable and secure. Research data management must always respect relevant laws and regulations (e.g. on the protection of personal data and other confidential data, or on intellectual property rights...), ethical codes, and/or contractual obligations with third parties, as well as the requirements included in the applicable regulations of external research funders (e.g. FWO, European Commission...). This may in particular include the obligation to remove the data from personal computers, ... from a specific time after completion of the thesis onwards.

Assessment

The master dissertation is assessed by the promoter, the copromoter and one commissioner. Either the promoter, copromoter or the commissioner must be a lecturer in the program, or someone authorised by the Examination Board in view of relevant expertise and strong familiarity with the program (e.g., a former teacher on the program).

The commissioner is appointed by the Examination Board, following the advice of the promoter. That is, the promoter is responsible for appointing a commissioner, but the proposal may occasionally be turned down by the Examination Board. Ideally, the commissioner is external to the research group of the promoter and possible copromoters. Commissioners are either academic faculty of Ghent University, or work more generally in academia or in a scientific institute, or are an expert in the subject matter. Tutors cannot act as a commissioner, but may assist the promoter in assessing the thesis.

The appraisal of the master dissertation happens on the basis of the written report and a final public defense. The student is only admitted to the final public defense when she/he has completed the pre-defense.

Before the public defense, the promoter and the commissioners evaluate the master dissertation with respect to contents and style. The assessment criteria used to score the written report are the clarity of the problem setting and objective, the accuracy in the choice, implementation and description of the methodology, the adequacy of the data processing, the discussion of the objectives and results that were obtained, and the relevance and correctness of the conclusions. The evaluation of the attainment targets and final competences of the master thesis also contribute to the final marks. The score given by the promoter must not only be based on the written report; it may also incorporate a permanent evaluation of the relevant competences that emerged during her/his meetings with the student. Promoter and co-promoter jointly give one score.

The promoter and the commissioner score the master dissertation individually on 20 points. They submit their scores to the secretary of the Examination Board (via mastat@UGent.be) prior to the public defense. On the basis of these scores the average result is calculated.

During the public defense the student presents the master dissertation, during and following which questions may be raised by the promoter, the commissioner, and by anyone of the audience. When the public defense is finished, the promoter and the commissioner score the public defense (based on the presentation and the answers to the questions). The student's presentation takes at most 15 minutes; the subsequent discussion typically takes 15 to 20 minutes.

Lay-out of the master thesis

The master dissertation must be written in English. The main text amounts to a minimum of 30 and a maximum of 50 numbered pages (format: DIN A4 (297mm x 210mm); margins above/left/right 2.5 cm; Character type 'Times New Roman' point size 12; one and a half line spacing including characters, tables and references. When a very large number of tables, figures and/or listings form an essential part of the report, they may be deferred to appendices that are submitted electronically along with the thesis. Note that in this case it is important to refer correctly from within the main text of the report to these appendices.

The master dissertation is written according to the rules of a scientific publication and includes the following components:

- Cover: identical to the title booklet (see point 3);
- One white page;
- Title booklet: established according to a uniform concept (see appendix) with indication of the university, the faculty, the academic year and title, the name of the student, the name of the promoter/co- promoter/tutor and the name of the department
- Admission for circulating the work (signed - copied signatures are not allowed) (see appendix)
- Foreword (maximum 1 page). This must state clearly what the student's contribution in the work was, what data sources were used and whether the data have a degree of confidentiality. In addition, possible acknowledgements may be made to people who have contributed to certain parts of the dissertation.
- Table of contents;
- Abstract/summary (maximum. 2 pages);
- Introduction;
- Methods and Results (this can be organized at your own preference);
- Discussion;
- Reference list;
- One white page;
- Cover

The numbering of the pages should start with the summary and finish with the last reference in the reference list.

The number of references is preferably limited to references which the student has studied thoroughly and which have been appropriate and essential for the formulation of the problem, the description of the methodology and for the evaluation and discussion of the results. All references that are necessary to avoid plagiarism should be included. References should be given in one of the following manners:

- The reference list enumerates the quoted references in chronological order of appearance in the text. References in the main text are stated with numbers (of appearance in the reference list) between brackets.

- The reference list enumerates the quoted references in alphabetical order of the first author's family name. References in the main text are stated by means of the family names of the authors and the publication year (unless there are more than 3 authors, in which case the family name of the first author is mentioned, followed by 'et al').

Figures and tables must be supported with a legend, which allows the reader to understand the table or the figure separately from the text. They are displayed in the text where they are referenced.

Formal definitions

The following definition is copied from the definitions section of the Examination Code of Ghent University.

Masterproef (Master's dissertation): Final paper completing a Master's programme. The study load of a Master's dissertation expressed in ECTS credits equals at least one fifth of the total number of ECTS credits of the study programme, with a minimum of 15 ECTS credits and a maximum of 30 ECTS credits. In the Master's dissertation, the student should demonstrate the ability to analyse and synthesize information, to solve problems independently at an academic level, or to create art. The project is to reflect the student's critical, reflective attitude or his/her disposition towards research.

Appendix A



Title

First name and name

Master dissertation submitted to
obtain the degree of
Master of Statistical Data Analysis

Promoter: Prof. Dr. name

Co-promoter: ...

Tutor: ...

Department Name of the promoter

Academic year 20.. – 20..

Appendix B

The author and the promoter give permission to consult this master dissertation and to copy it or parts of it for personal use. Each other use falls under the restrictions of the copyright, in particular concerning the obligation to mention explicitly the source when using results of this master dissertation.

Addendum to Master thesis

Name student:

Name promoter:

Thesis title:

Date pre-defense:

Name and signature of one of the members of the Examination Board, testifying successful participation in the pre-defenses:

Date seminar 1:

Title seminar 1:

(Add details of the seminar on an extra page: speaker's name, title and abstract, time and location)

Signature of the promoter, testifying approval of and attendance of the seminar:

Date seminar 2:

Title seminar 2:

(Add details of the seminar on an extra page: speaker's name, title and abstract, time and location)

Signature of the promoter, testifying approval of and attendance of the seminar: