FACULTY OF PHARMACEUTICAL SCIENCES
FACULTY REGULATIONS CONCERNING THE MASTER'S DISSERTATION IN THE MASTER OF PHARMACEUTICAL ENGINEERING

The Education and Examination Code (EEC) of Ghent University remains fully applicable.

Article 1

The master's dissertation comprises all activities and outcomes (thesis research, research internship, and dissertation) of independent scientific research. Through the master's dissertation, the student demonstrates the ability to:

- Formulate and contextualize a research question scientifically;
- Identify and utilize significant information sources in the studied area;
- Apply scientific research methods to solve a (specific) (pharmaceutical) problem;
- Critically interpret the results of the conducted research and adequately report them in a dissertation

Article 2

The master's dissertation course unit spans the entire academic year (first and second semester) of the second year in the master's program model trajectory.

Article 3

The student selects one or more research themes. To this end, the potential promotors (see Article 5) offer a sufficient number of research themes. The student may also propose their own research theme to a promotor, but this can only be accepted with the supervisor's agreement.
The student must submit the chosen master's thesis research theme(s) during the second semester of the academic year preceding the academic year in which the master's thesis will be completed. For a master's thesis involving an (international) Erasmus research internship, the student must also submit the chosen master's thesis research theme(s) during the second semester of the academic year preceding the academic year in which the master's thesis will be completed.
The faculty ensures a system that allows for a fair and definitive allocation of research themes. It strives to offer as many students as possible a subject from their top five choices. Academic performance may be used as a criterion, but it can never be the sole basis for assigning a research theme.

Article 4

The selected research theme for each student must be approved by the Faculty Board of the Faculty of Pharmaceutical Sciences no later than one month before the start of the master's thesis.
Subsequently, any (essential) changes can only be authorized by the same Faculty Board, which may delegate this authority to the dean.

Article 5

The master's thesis research, the dissertation, and the oral evaluation are assessed by an evaluation committee consisting of one supervisor and two commissioners (see Article 6). All ZAP (permanent academic staff) members and visiting professors with teaching assignments in the Faculty of Pharmaceutical Sciences or the Faculty of Bioscience Engineering are eligible to act as supervisors. They may be assisted by a co-supervisor. For domestic master's theses, all holders of a doctoral degree with a minimum of three years of postdoctoral experience—either as researchers or in a pharmaceutical engineering-oriented context (internal or external to the faculty or Ghent University)—can also serve as supervisors.

In the case of a master's thesis conducted outside the Faculty of Pharmaceutical Sciences but within Ghent University, the ZAP member of the host laboratory acts as the supervisor. For an Erasmus research internship, the sending ZAP member acts as the supervisor. For research internships within or outside Ghent University, where the supervisor does not belong to the ZAP members or visiting professors with teaching assignments in the Faculties of Pharmaceutical Sciences or Bioscience Engineering, the relevant doctoral holder with the required seniority (as described above) serves as the supervisor. They must be supported by a co-supervisor.

In the case of postdoctoral researchers from the Faculty of Pharmaceutical Sciences or the Faculty of Bioscience Engineering, their supervising ZAP member acts as the co-supervisor. For postdoctoral researchers from outside these faculties, a ZAP member from either the Faculty of Pharmaceutical Sciences or the Faculty of Bioscience Engineering, appointed by the postdoc's primary supervisor, acts as the co-supervisor. This co-supervisor commits to taking over supervision if external circumstances prevent the original supervisor from continuing their duties. The Faculty Board ensures an equitable distribution of students across the various supervisors, specifically the faculty ZAP members and postdoctoral researchers.

Article 6

As assessors, priority is given to all ZAP members and postdoctoral researchers of the Faculty of Pharmaceutical Sciences or the Faculty of Bioscience Engineering. Secondly, all individuals eligible to serve as supervisors for a master's dissertation under Art.5 may also act as assessors, provided they possess the necessary expertise related to the dissertation topic.
The assessment committee must include at least one ZAP member, as well as at least one member from the Faculty of Pharmaceutical Sciences or the Faculty of Bioscience Engineering. These roles may be fulfilled by the same individual.

Article 7

Assessors are nominated by the supervisor after confirming their willingness to act as assessors.
The Faculty Council approves the nominations and ensures a fair distribution among ZAP members and postdoctoral researchers.

Article 8

A midterm feedback meeting takes place between the student and the supervisor and/or operational mentor, with a brief report compiled using a template. For Erasmus internships, the midterm feedback meeting is conducted by the foreign supervisor and/or operational mentor, with the report forwarded to the supervisor. The student is responsible for initiating the feedback meeting, preparing the report, and ensuring its availability. Both the (Erasmus) supervisor and the student receive a copy of this report.

Article 9

Generative AI (GenAI) can be utilized at various stages of a research project, including designing the study, analysing and proposing data and results, as well as presenting parts of the research both in writing and orally. The use of GenAI tools during the execution and writing of a master's thesis should be approached with a critical eye and scientific integrity. These principles are fundamental to scientific research and the role of scientists. Therefore, the following guidelines outline the responsible use of GenAI throughout the master's thesis, organized by key competencies.

9.1. Formulating the research question

Key competency: Ability to delimit and define a scientific problem based on scholarly literature and translate it into a concrete research question or questions.

GenAI can serve as an inspiration when formulating research questions by generating a list of potential questions or hypotheses within the research field. Additionally, refining the research question can be achieved by providing context and specific conditions in prompts, especially since the initial research question is often guided by the supervisor. GenAI may be used as a source of inspiration and for brainstorming possible research questions. However, it is essential to critically evaluate GenAI's suggestions and use them primarily as a foundation for ideas. Defining a research question should be an iterative process, with regular consultations with the supervisor to ensure precision and comprehensiveness. Even if GenAI generates strong research questions, the final version must always receive supervisor approval.

9.2. Searching for scientific papers and other source material

Key competency: Ability to collect and critically evaluate relevant scientific literature.

GenAI can function as a supplementary search tool (e.g., Perplexity, GPT-4, Copilot) alongside established databases like PubMed, Web of Science, and Google Scholar. It can also summarize, compare, and critique sources. Searching for relevant references and source material using GenAI and summarizing and comparing these sources for preliminary insights are permitted. However, it is crucial to always consult the original sources referenced by GenAI. Each result from GenAI search tools should be critically assessed, considering potential biases and the possibility of fabricated sources. Summaries must be accurate and contextualized within the research framework. Referencing non-existent sources generated by GenAI constitutes fraud. Original sources must always be cited in the bibliography; references to GenAI-generated content are not accepted.

9.3. Developing the research methodology

Key competency: Ability to establish an appropriate methodology to answer the research question(s).
GenAI can assist in developing various research methods for data collection, both quantitative and qualitative. For example, it can help design laboratory experiments or formulate survey questions. Brainstorming potential research methods and data collection techniques with GenAI and exploring different methodological approaches are allowed. It is important to assess the feasibility of proposed methods concerning time and available resources and to justify the chosen methodology in the thesis, explaining its suitability for the research question. A deeper understanding of the selected methods beyond GenAI's suggestions is necessary. GenAI should not be cited as a source for the methodology; original works where the methods are described must always be referenced.

9.4. Conducting the research

Key competency: Ability to plan and independently execute experimental research.

GenAI can aid in drafting and scheduling the research plan, developing protocols, and serving as a reference for specific procedures. When explaining the methodology in prompts, GenAI can provide more robust outcomes, acting as a guide throughout the research process. Developing and planning experimental research with GenAI as a coach and generating ideas for research protocols and schedules are permitted. However, it is essential to execute the experimental research personally and not rely on GenAI-generated datasets as original data. GenAI-generated datasets should be used solely as inspiration, not as actual research data. Using GenAI-generated datasets as research data is considered fraud.

9.5. Analyzing, writing, and presenting research Data

Key competencies: Ability to critically analyse and interpret research results, draw valid conclusions, report scientific research in writing, and present findings effectively.

In the stages of analysing, writing, and presenting research data, GenAI can be utilized to assist in various ways while adhering to ethical standards. For data analysis, GenAI can help brainstorm statistical tests, types of graphs, and methods for data visualization, as well as assist in contextualizing results within the broader scientific landscape. However, the selection of appropriate analyses and visualizations must be determined independently, with methodological choices justified in the thesis. Any code generated by GenAI should be reviewed and understood before use in data processing software (e.g., R, Python, GIS).
When writing the thesis, GenAI may be used to identify and correct grammatical and spelling errors, seek inspiration to rephrase sentences, and assist in translating text, followed by critical review. It is imperative that GenAI-generated text is not used as a reliable source for scientific information and that no new data, information, or sources are added by GenAI that were not part of the original work. Privacy-sensitive or confidential data must not be shared when using GenAI for writing assistance.
For presenting research, GenAI can support the preparation of oral presentations by offering tips and strategies, acting as a sparring partner or virtual study group member, and generating (PowerPoint) slides and illustrative images with proper source attributions (e.g., “Image/illustration generated by [AI tool]”). However, AI-generated slides should not be used in the final presentation. Instead, personal slides should be developed and designed to ensure quality and coherence with the oral evaluation. Additionally, GenAI-generated questions may be used to prepare for the oral evaluation, but answers should be thoroughly studied and understood to ensure deep preparation.
Throughout these stages, it is essential to ensure that original research data or confidential information is not input into GenAI tools. Only fictitious datasets with altered variables, data types, and formats containing dummy data may be shared with GenAI. All research data must remain the researcher’s own and be handled in compliance with data privacy and intellectual property regulations. Incorporating GenAI-generated content without critical evaluation and understanding, and referencing GenAI-generated interpretations without cross-verifying with original materials, are prohibited.

Article 10

The dissertation must be submitted electronically. Upon specific request from the supervisor or an assessor, a printed version may also be required for the requesting party. The dissertation must be submitted to the student administration of the Faculty of Pharmaceutical Sciences. The submission deadline is determined annually by the Faculty Council.

Article 11

The dissertation must be typed and formatted in accordance with the UGent house style. The title page (cover and first page) must only include the following details:

- Ghent University;
- Faculty of Pharmaceutical Sciences/Faculty of Bioscience Engineering, alternatively Faculty of Bioscience Engineering
- Academic year 20. . - 20. .;
- Title of the master's dissertation;
- Name of the student;
- "Master dissertation in the Master of Pharmaceutical Engineering.

The inside back cover of the dissertation must include the following details:

- Master's dissertation submitted to the Faculty of Pharmaceutical Sciences, alternatively Faculty of Bioscience Engineering, conducted in collaboration with the Laboratory for … (affiliation of the supervisor, which may refer to a UGent research group, an external or foreign (Erasmus) research group, or an external company, laboratory, hospital, etc.)
- Name of the supervisor;
- Name of the (optional) co-supervisor;
- Name of the assessors;
- "The information, conclusions, and viewpoints included in this master's dissertation are the responsibility of the author and do not necessarily reflect the opinion of the supervisor or their research group".

The total number of pages must not exceed 50, including the bibliography, but excluding the table of contents, acknowledgments, list of abbreviations, and any appendices (these appendices must not constitute an integral part of the dissertation; in other words, the dissertation must be interpretable without the appendices).The dissertation must include both a table of contents and a bibliography.

Article 12

The student defends their master's dissertation before the assessment committee during the designated examination period.
The oral evaluation is organized according to a strict 30-minute schedule per student, as follows:

- Max. 5 minutes for preliminary deliberation;
- Max. 5 minutes for the student's presentation;
- Max. 15 minutes for the oral evaluation;
- Max. 5 minutes for deliberation on the presentation, questioning, and brief feedback

The student leaves the meeting for the deliberation. Only the members of the assessment committee are present during the deliberation. Immediately following the deliberation, the student is provided with brief qualitative feedback, if desired, highlighting both the strong and weaker aspects of the master's dissertation. No scores are disclosed during this feedback. Preferably, the three evaluated components (see Article 12) of the master's dissertation are addressed.

Article 13

Evaluation of effort and attitude:
The student's effort and attitude, both during the research phase and the writing process, are assessed by the supervisor using a standardized evaluation form. The supervisor assigns a score out of 10

Evaluation of the Master's Dissertation (written work):
The master's dissertation is evaluated by each member of the assessment committee. The scoring is out of 10. A standardized evaluation form serves as a guideline for this process. The difference between the scores assigned by individual members may not exceed 1.5 points. The final score is the arithmetic mean of the individual scores from all members of the assessment committee.

Oral evaluation:
The oral evaluation is also evaluated by each member of the assessment committee. The scoring is out of 20. The difference between individual scores may not exceed 3 points. The final score is the arithmetic mean of the individual scores from all members of the assessment committee.
To pass the entire course unit, students must succeed in all three components (effort/attitude, master's dissertation, and oral evaluation).

If a student fails one or more components (effort/attitude, master's dissertation, or oral evaluation), the total score will be capped at a maximum of 9/20. There is no second examination opportunity for the effort/attitude component. In such cases, the entire master's dissertation course must be repeated. If applicable, an attitude report is prepared by the supervisor. In the case of a master's dissertation conducted abroad (Erasmus), the student cannot participate in Erasmus again.

If the student passes all three components (effort/attitude, master's dissertation, oral evaluation), the final grade is calculated using the following weighting factors:
-The evaluation of the student's effort and attitude by the supervisor (25%)
-The evaluation of the master's dissertation by the supervisor and assessors (25%)
-The oral evaluation by the supervisor and assessors (50%)

Article 14

The master's dissertation must be written in English. The oral evaluation is also conducted in English.

TERMINOLOGY

- Master's dissertation: The entirety of the project, serving as an overarching term. It encompasses the research work, which may include a research internship, the dissertation, etc.

- Dissertation: The written output of the research work ('thesis').

- Internship (replacing the term "stage" in this context): The actual (sustained) presence in a research group (Erasmus internship, domestic internship external to UGent, etc.).

- Research work: The actual work performed under the scope of research by the student. This can take various forms, such as an internship, conducting a structured review, etc.